THE INHERITANCE OF INEQUALITIES: SOME BIOLOGICAL, DEMOGRAPHIC, SOCIAL, AND ECONOMIC FACTORS

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Read 5 December 1973

IN a society in which there were no governmental inter-ferences with the operation of the competitive markets and no other artificial impediments to competition or mobility, persons who were similarly endowed would tend to receive the same incomes.

But if individual citizens are not equally endowed, then personal incomes may continue to be unequal even in a fully competitive, *laissez-faire* society with unrestricted mobility. The man with little skill and ability will not necessarily be able to undercut the man with great skill and ability, even though the earnings of the latter greatly exceed those of the former. The man with much property will have a higher in-come from property than the man with little property even though the rate of return on all properties were the same.

In this lecture I wish to isolate for examination some of the factors which would cause citizens to be unequally endowed and thus to receive unequal incomes even in a competitive, *laissez-faire* society with unrestricted mobility. For this purpose I shall proceed for the most part as if there were free competi-tion, unimpeded mobility, and no governmental interference in the economy; and, on these assumptions, I shall inquire what influences one would expect still to remain to cause inequalities in personal endowments of income-earning factors of production. I am not thereby intending to assert that the actually existing structure of inequalities can be explained without allowing for the influence of such factors as customary ideas about fairness which may cause rigidities in pay differ-entials, or impediments to movement from a low-paid to a high-paid occupation, due, for example, to trade union or

similar restrictions on the entry of outsiders into a protected occupation, or governmental tax policies and similar measures many of which are expressly designed to affect the distribution of incomes and properties. I am merely engaged in one pre-liminary exercise of abstraction which may help to bring to one's attention certain important influences which must be brought into any final calculation.

A citizen in a *laissez-faire* competitive society would receive certain endowments from his parents which would help to determine the amount of income which he could earn and property which he could accumulate during his own lifetime. This in turn would affect the endowments which he could hand on to his children.

The endowments with which we will be concerned may be enumerated under four heads.

First, a citizen will be endowed with a certain genetic make-up. There is some genetic component in intelligence which may affect earning capacity. But it would be a mistake to forget other characteristics which probably have some genetic component and which may well exert a greater influence on earning capacity. Quite apart from straightforward bodily strength and health, there may be other relevant physical differences which have some genetic component; there may, for example, be some genetic influences affecting the vocal cords of Mr. Fischer-Dieskau and Miss Janet Baker which help to explain their ability to earn income. There may also be genetic components in the determination of certain qualities of charac-ter which have an income-earning potential, though it by no means follows that all of these are desirable in themselves. Thus a certain streak of ruthlessness and aggression may be helpful to the accumulation of wealth without being in any basic ethical or aesthetic sense good or desirable qualities in and for themselves.

Second, a citizen may inherit a certain amount of income-earning property of one kind or another from his parents.

Third, a citizen will have received as a child a certain educa-tion and training. In a strictly *laissez-faire* competitive society this education and training will have been provided and financed privately by his parents, though this is, of course, one of the fields in which my neglect of governmental interventions and policies is especially significant.

Fourth, there are the rather less tangible advantages or disadvantages which accrue to a citizen through the social

contacts which he makes with other persons, these social contacts being much affected by the social background into which he was born.

These two last elements of endowment—namely, education and social contacts—must in my scheme of things cover a very wide range of social phenomena. Education obviously covers an individual's formal education and training at school, university, or similar institution. Social contacts obviously cover a citizens' range of acquaintances who through their particular brand of the old-boy network can or cannot get him a good job or provide him with a favourable investment opportunity. But there are many other factors to be taken into account which in my limited scheme must be put into either the one or the other of the very general categories of 'education' and 'social contacts'.

I personally think of the category of education as covering practically all of the environmental influences which affect the development of an individual's knowledge, character, and motivation. He will thus receive much of his so-defined education directly from his parents as they bring him up in a certain way and from the acquaintances he makes—to say nothing of the education which a husband receives from his wife, and if Women's Lib will allow me to say so, which a wife may receive from her husband.

If education is defined in this very broad way, then social contacts must be narrowly defined and are reduced to little more than a catalogue of the sort of friends, acquaintances, neighbours, and colleagues with whom an individual spends his days.

A citizen is thus fortunate or unfortunate according as he starts out in life with a helpful or unhelpful endowment of genes, inherited property, education, and social contacts. But in addition to these initial structural elements of good or bad fortune which are determined by his family background, a citizen will also encounter many elements of good or bad luck in the course of his career. To take but one example, two men with the same inborn ability and the same initial advantages of education, property, and social contacts may end up with very different incomes and properties, simply because they embarked on careers in different lines of economic activity, one of which prospered and the other of which declined. And yet at the time of choice the prospects of the two activities may have seemed very similar to both of them and it may have

been a matter of almost random chance which determined the choice of career. In what follows I shall use the term 'fortune' to describe the basic structural endowments of genes, property, education, and social contacts, and the word 'luck' to describe the many chances in life which determine the actual outcome within these structures of basic endowments. One cannot, of course, draw any hard and fast line between elements of fortune and elements of luck as I have tried to describe them; they are both mixtures of recognizable laws of cause and effect and of strokes of pure chance; but the nature of society—or should I say of the social studies?—is such that it seems to me useful to think in terms of some such broad distinction.

Social scientists examine the general genetic, demographic, social, and economic structure of society. They consider the characteristics of, and the factors affecting, various groups: income groups, property groups, I.Q. groups, social classes, age and sex groupings of the population, occupational classes, classes of educational attainment, and the like. *A* may be born into one set of groupings and *B* into another. When the souls of little *A* and little *B* were lining up in heaven to be sent forth on their sojourn in this wicked world, did they toss up as to which soul should occupy which niche in the social structure which they were joining? I do not know. But I shall refer to the structured endowments which *A* and *B* receive in society by joining whatever group they do join as their good or bad fortune.

However, different people within the same niche in the structure of society may fare very differently in the course of their lives. It is the causes of these divergences in the fates of two persons within the same fortunate or unfortunate structural niche which I shall call factors of luck. This is not to assert that these factors are in any fundamental sense less subject to laws of cause and effect than are the factors of fortune. My category of luck certainly contains all those causes of inequality which are not explained by the structured influences of what I have called fortune; and there may well be disciplines other than present-day economics and sociology which would help to explain why two persons with the same structured fortune fare differently in the outcome.

The basic structural endowments of good or bad fortune are handed down from parent to child; but the child as he grows up moulds and modifies the basic endowments which he received as a child from his mother and father, before he amalgamates

them with those of his wife and passes this package of *modified* and *mixed* endowments of fortune on to his own children. I will start first with a consideration of the way in which an individual's initial endowments may be *modified* as he grows up; and I will turn later to the implications of the fact that he *mixes* these *modified* endowments with the already *modified* endowments which his wife received from her parents before the two of them hand on this modified mixture to the next generation.[1]

Let us then consider how a citizen's passage through life may affect the elements of basic structural fortune with which he was initially endowed. This is illustrated in my diagram in which I consider the way in which a particular citizen—let us call him Tom Jones—starting out as little Tommy receives his basic endowments from his home background, proceeds through life, and at length as poor old Tom or Thomas Jones Esquire or maybe even Sir Thomas Jones, G.C.B., himself contributes to a home background transmitting endowments to his children.

Tom Jones then starts in a home background (H_1) which is built up by his father and mother. We are concerned with his parents solely as instruments affecting his basic endowments of good or bad fortune; and in this sense his father and mother are themselves simply bundles of factors which will affect their ability to provide Tom Jones with his initial endowments of fortune. The parents' relevant factors I assume to be the mother's and the father's genes $(G_m,$ and $G_f)$ (line 1), education $(E_m,$ $E_f)$ (line 2), and social contacts $(C_m,$ and $C_f)$ (line 4), and their joint income (Y_j) and property (K_j) (lines 3 and 5). These together constitute the home background which provides Tom Jones with an endowment of genes (G), education (E), social contacts (C), and property (K). Thus in the diagram we look upon the home background as a GEYCK which produces a GECK for each child.

One must not, however, regard this endowment of Tom Jones by his parents as a once-for-all affair which occurs instantaneously at his birth. It is a continuing process; and this introduces two interacting dynamic factors. In the first place, Tom Jones will be susceptible to different endowments at different stages of his life: to his parents' genes once-for-all on

[1] I have put this example in terms of a boy only because the English language does not possess a pronoun which covers both male and female. Solely for this reason in what follows I shall analyse in terms of the male sex much that applies equally to the female sex.
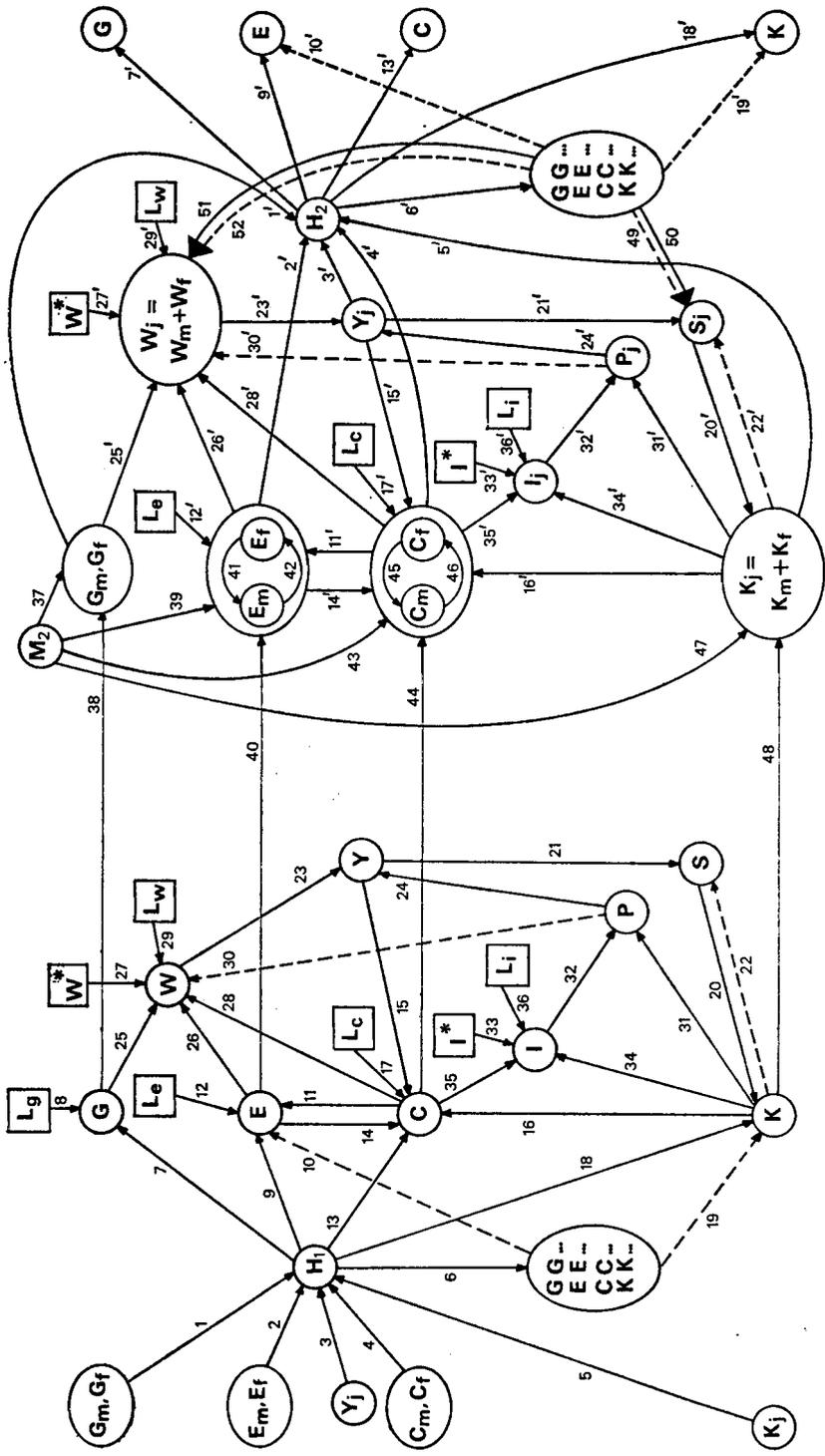
his conception, to the qualities of his mother's care as an infant, to his parents' friends at a later stage, to his inheritance of property on his parents' deaths, and so on. Second, his parents' own education, income, social contacts, and property will be developing during their years as home-builders and parents, so that what they have to give as well as what Tom Jones is ready to receive will be changing over time.

I shall at first neglect the influences affecting what Tom Jones's parents have to contribute and shall take the nature and development of his parents' genes, education, income, social contacts, and property as given. I shall return to this set of problems when I close the cycle and come to regard Tom Jones himself as a parent. I will then consider his development as a provider of endowments for his children. For the time being I wish to consider him solely as a recipient of a given developing flow of basic endowments from his parents, which he himself then develops further.

To return to the diagram, Tom Jones's parents may produce brothers and sisters for him, and these are represented by the little GECK's which proceed from Tom Jones's home background H_1 (line 6). But the main purpose of my diagram is to put the individual Tom Jones under the microscope.

From his two parents Tom Jones receives his genetic endowment (G) (line 7). But while his genetic make-up is basically conditioned by that of his parents there is also an element of luck (L_g) (line 8). Two children of the same parents will not receive identical genetic endowments unless they are identical twins. Tom Jones can draw his genes only from those offered by his parents; but he may have good or bad luck in his draw from the parental stock.

Tom Jones will receive an education (E). In the absence of governmental intervention not only much of his early up-bringing but also his formal education and training will be provided for him by his parents (line 9). However, the greater the number of Tom Jones's brothers and sisters, the less his parents may be able to afford out of their given time, income, and property to invest in Tom Jones's individual education (line 10). In addition to his home background and formal education, much of what I have broadly defined as his education will be continued during his own career by his social contacts, that is to say, by the sort of friends and colleagues with whom he associates (line 11). But in all this there is a considerable admixture of luck (L_e) (line 12). To take only one example, his

parents may make most carefully calculated decisions about the amount of money which they will invest in his education and about the educational institutions to which they will entrust him. But the outcome may be greatly affected in ways which it may be impossible to foresee by luck—as, for example, whether a particular teacher happened to fire young Tommy's imagination and interest in a particular subject or activity.

Tom Jones will inherit certain social contacts (C) from his parents (line 13), since the social environment of his home background will greatly affect his choice of friends and acquaintances. But as he grows up his social contacts will develop and will depend upon the way in which his own career develops. An important factor will be the social contacts which he makes at school or other educational institutions (line 14). Thereafter, the further development of his social contacts is likely to be affected by his material success in life. If he manages to earn a high income (Y) or to acquire much property (K), the fact that he is a man of riches will enable him to make contacts with people who will be useful to him in his career (lines 15 and 16). Finally, of course, there is an important element of luck (L_c) in the people he meets and the friends he makes (line 17).

From his parents Tom Jones may also receive property (K) (line 18). But once again the greater the number of Tom Jones's competing brothers and sisters, the smaller will be his own share of the family property (line 19). As time passes he may supplement this property from his own savings (S) (line 20). The level of these savings will be affected by many considerations; and in the diagram I have introduced only two of the most important.

In the first place, the higher is his income the greater will be Tom Jones's ability to save (line 21).

But, in the second place, the greater the property which he has already acquired (perhaps by inheritance) the smaller will be his need to save, since there will be less need to abstain from present consumption to acquire a property to support him in his old age or to give him security against adversity. This fact that the higher his property (K) the lower will be his savings (S) is represented by the broken line 22.

It remains to consider the factors determining the level of Tom Jones's income as he passes through life. His income (Y) is simply the sum of his earnings or income from work (W) and of his income from property (P) (lines 23 and 24).

His earnings will be affected by many factors. First of all there is his capacity to earn which will be affected both by his genetic endowment and by his educational endowment (lines 25 and 26). But, given his ability his actual earnings will depend upon the structure of wage rates that exist in the market for different kinds of ability (W^*) (line 27). Earnings, however, are not determined exclusively by a given market wage rate for a given ability. There is an element of fortune in that good social contacts may enable a man to make a more rewarding choice of job (line 28); and there is also an element of luck (L_w) in determining whether Tom Jones will be successful in his choice of occupation or in the development of his particular job (line 29).

There are other important influences in the real world which I am neglecting as a result of my assumption of free competition—influences such as trade union or similar restrictions on entry into protected occupations or customary differentials in pay which interfere with market forces. But there is one further consideration which I cannot neglect in my competitive economy.

Tom Jones's earnings will depend in part upon the amount of effort which he chooses to put into the business of earning a high income. This is influenced by many factors; but among these we may suppose that the higher is Tom Jones's income from property (P), the lower—other things equal—will be the effort which he puts into earning an income from work (line 30). Indeed if he has a sufficiently high income from property he may not bother to earn any additional income at all.

At this point I must digress to ask myself whether my diagram covers the undoubted fact that Tom Jones's own moral character and motivation will affect how hard he will work and what steps he will take to get on. Do not some people get on— and deserve to get on—because they try hard and others fail to make good—and deserve to fail—because they make little or no effort to help themselves? We are immediately faced by the riddle of free will. Do not a man's genetic and environmental endowments, together with some elements of pure luck, for which he can in no way be held responsible, determine his moral character and motivation as well as his ability? If so, it can all be comprehended in lines 25, 26, 28, and 29 of my diagram. But it would then seem meaningless to assert that Tom Jones was in any way a free agent in deciding whether to deserve success or failure. But if one does believe in some

measure of free choice and personal responsibility for success or failure—and I cannot help doing so—there is something vital—but I do not quite know what—missing from my diagram. This is one of those many difficulties which I learned from Professor Sir Dennis Robertson to look squarely in the face and pass on.

Let us turn now from Tom Jones's earned income to his income from property (P). This is simply his property (K) multiplied by the average yield or rate of interest on it (I) (lines 31 and 32). The yield on property will be basically determined by the structure of the ruling market yields on various types of property (I^*) (line 33). But the actual yield obtained may well be affected by Tom Jones's investment opportunities. Thus the yield on property is likely to be higher for a man with much property to invest (line 34) and for a man with the right social contacts (line 35). A man with a large property can afford to take more risks in his investments, and the cost of advice from stockbrokers and of other investment services can be spread over a larger capital fund. For these reasons a large property normally obtains a higher yield than a small property. Moreover, a wealthy man is more likely to have those social contacts which will enable him to be better informed about the chances of profitable investment. Finally, let me point out, in case any of you have not operated on the stock exchange, there will be an element of luck in Tom Jones's choice of investments for his property (L_i) (line 36).

Tom Jones grows up into mature manhood with a certain make-up of genes, education, income, property, and social contacts, these elements of his make-up being, as we have seen, partly inherited from his original home background and partly made up by his own social and economic development. He is now ready to marry a wife and to become a father; and together these two bundles of genes, education, income, social contacts, and property having joined together in holy matrimony, are ready to make up a second-generation home background for the next generation of children.

I will turn to their married life in a moment. Let me pause for a little to comment on my account of Tom Jones's bachelor life.

A very marked feature of the simple model which I have presented in the diagram so far is the amount of positive feedback which it contains, that is to say of self-reinforcing influences which help to sustain the good fortune of the fortunate and the bad fortune of the unfortunate.

Let me give two examples.

The first concerns job opportunities. A man who for any reason starts with a high income may be able to make appropriate social contacts which enable him to find exceptionally repaying jobs which will in turn help to raise his income still further (lines 15, 28, 23).

My second example concerns the accumulation of property. A man who for any reason of good fortune has a high income can save much and accumulate a large property (lines 21 and 20). But with a large property he has a high income from property (line 31) and thus a still higher income (line 24). Nor is that the end of the matter; with a high property he can probably get a high yield on his property, partly because a large property can be more cheaply and effectively managed than a small property (line 34) and partly because a man of wealth will be better able to make the sort of social contacts which will enable him to invest his property profitably (lines 16 and 35). Thus the yield on his property, as well as his property itself, will be raised simply because his initial fortune was good.

This particular set of positive-feedback relationships probably helps to explain one of the very pronounced phenomena in our type of society—namely, the very much greater degree of inequality in the distribution of the ownership of property and of income from property than in the distribution of earned income. An individual with a high income is able to save a higher proportion of his income than can an individual with a low income. A man with high earnings will thus accumulate a property which is high relative to his already high earnings. If, having a high property, he then gets an especially high yield on property, his income from property will become large relative to his property which will become large relative to his already high earnings. Conversely, for the citizen with low earnings, his income from property will be low relative to his property which will be low relative to his already low earnings. The discrepancy between high and low property incomes will be much greater than the discrepancy between high and low earnings; and to anticipate my analysis, these discrepancies are likely to be perpetuated from one generation to another through the inheritance of properties and earning capacities.

My diagram has many positive-feedback loops. It contains through the broken lines 22 and 30 only two examples of negative feedbacks, of influences, that is to say, which damp down rather than multiply the results of initial good or bad fortune.

Thus it is probable that the higher is a man's property the smaller is his incentive to cut back his present consumption in order to save and accumulate; and this factor damps down the way in which large properties tend to lead to still larger properties (line 22). In a rather similar manner the existence of a high income from property reduces the need for income from work and may thus damp down the incentive to earn more (line 30); and this factor may reduce the positive, reinforcing effects which we have just examined, whereby high incomes lead to still higher incomes.

However, my assumption of *laissez-faire* has forbidden me to display on my diagram some fundamental elements of negative feedback which may be at work in the real world through governmental interventions. Progressive taxation, the provision of free education and medicine, and the payment of social security benefits or other supplements to the incomes of those who are less well off, in so far as they are effective in redistributing income from the rich to the poor, are outstanding examples of such negative feedbacks. In such circumstances a rise in a man's gross income and wealth (before governmental adjustment) causes a less than proportionate increase in his net income and wealth (after governmental adjustment); and this diminishes the multiplier whereby initial good fortune feeds upon itself and magnifies the final outcome.

But there remain in society very strong elements of positive feedback which I have illustrated in my diagram. Two results follow from this.

First, there is the obvious point that there are some apparently powerful built-in tendencies for the rich to sustain their riches and the poor their poverty which one would expect to help in explaining the persistent continuation of the large inequalities in income and wealth which we actually observe in society.

A second major result may be expected fron the intertwining of the many positive feedback loops in my diagram, namely that the various endowments passed from parent to child are likely to become highly correlated with each other. Thus if Tom Jones is born with a set of useful genes which help him to earn a high income this will enable him to make useful social contacts and to accumulate a sizeable property. Thus as a father he is likely to be a bundle not only of useful genes, but also of a useful income, a useful property, and useful social contacts. There will be a strong tendency in society for good or bad fortune

to be handed on to the next generation in associated parcels of genes, income, property, and social contacts.

This tendency for the useful endowments of various kinds to become associated with each other will be further strengthened when we allow for the mixture of Tom Jones's endowments with those of his wife. Tom Jones marries Mary Smith. Tom Jones may be fortunately endowed with an educational and genetic make-up which turns him into an able, enterprising, perhaps ruthless, but anyhow successful businessman. Mary Smith may be fortunate in being the heiress to much property and endowed with the best social contacts. If in society there is a tendency for the fortunate to marry the fortunate and for the unfortunate to marry the unfortunate, whatever may be the primary cause of their good or bad fortune, then there will be a tendency for Tom Jones's useful genes and education to be joined with Mary Smith's useful property and social contacts. The various elements of basic endowments will become more highly correlated with each other.

But I am anticipating the next stage of my analysis. If the new biologists had already succeeded in getting rid of sex as a method of human reproduction, I would have little to add to the analysis presented in the first half of my diagram. If Tom Jones by some process of cloning could by himself produce a little son with an exact replication of his own genes, we could explain most of the factors affecting the development of in-equalities of income and wealth as between various families by concentrating solely on the influences which I have discussed so far. Tom Jones would receive his endowments of genes, education, social contacts, and property from his father. He would hand these same genes on to his son; subject to all sorts of luck, he would develop his property and social contacts in the way which we have examined and, in the light of this development of his fortune, he would pass on an education, social contacts, and property to his sons. The situation could be much affected by the number of sons which he decided to clone—I will return to that subject in due course—but apart from that there would be little to add to the analysis.

But the fact that he has to marry Mary Smith and mix his genes, income, social contacts, and property up with hers before they jointly endow their sons and daughters introduces many basic modifications into the analysis. We will start the analysis of these problems by assuming that Tom Jones has chosen, or been chosen by, a particular Mary Smith with her

own particular bundle of genes, education, social contacts, and property as they exist at the time of her marriage. I will discuss later the very important question what it was that brought Tom and Mary together. For the moment I am interested in the implications of their joint family life.

A family is more than a number of individuals. In the first half of my diagram we watched the development of Tom Jones as an individual bachelor. In the second half of the diagram we watch Tom and Mary Jones's family developing as a joint concern.

I represent Mary Smith as M_2, namely as a second-generation Mother. For our purpose she is simply a bundle of factors relevant for the joint building of a second-generation home background (H_2) for the endowment of the second generation of children. She brings into the marriage her genes, education, social contacts, and property, the nature of which depend upon what endowments she has received from her parents and the way in which she has developed them during her spinsterhood.

Thus Tom and Mary together provide a pool of mothers' genes (G_m) and fathers' genes (G_f) for use by the family (lines 37 and 38). They provide mother's education (E_m) and father's education (E_f) to form part of the family background (lines 39 and 40). Their educations in my broad sense of the term continue during their married life; and this is partly due to the fact that they educate each other (lines 41 and 42). They provide the mother's and the father's social contacts for use by the family $(C_m$ and $C_f)$ (lines 43 and 44); and Tom's contacts enlarge Mary's contacts and vice versa (lines 45 and 46). They both bring some property into the family $(K_m$ and $K_f)$ (lines 47 and 48); and I am assuming that they form a close-knit family in which the two properties are for practical purposes merged into a single joint family property $(K_m + K_f = K_j)$ with a corresponding joint family income from property (P_j) derived from the yield on the joint family property (I_j). Similarly I assume also that Tom and Mary merge their individual earnings into a joint family income from work $(W_m + W_f = W_j)$. Thus there is a joint family income (Y_j) from which joint family savings (S_j) are made.

The main relationships within this family are now exactly similar to those in the first half of my diagram. I will not bore you with a tedious repetition of the strokes of luck which Tom and Mary may find in their further education, their social contacts, their investments, or their jobs, nor with the way in

which the various elements in their family structure feed back upon each other. The relevant lines in the second half of my diagram correspond exactly to the same relevant lines in the first half of my diagram.[1]

All that part of the second half of the diagram is a mere application to the joint family of the relationships considered at some length in the case of Tom Jones's bachelor life. But there is now an important additional consideration to be introduced.

At the far right of the diagram we have a new home background (H_2) made up of Tom's and Mary's genes, education, income, social contacts, and property as these develop during their married life (lines 1', 2', 3' 4', 5'); and these provide endowments of genes, education, social contacts, and property as Tom's and Mary's little GECK's are born and grow up. If we want now to consider the life-cycle of one of these in particular (for example, the life-cycle of Tom's and Mary's son Richard), we start from the large GECK at the far right of the diagram, which shows Richard Jones endowed with genes, education, social contacts, and property from his home background (H_2) (lines 7', 9', 13', and 18'), but competing for education and property (lines 10' and 19') with his brothers and sisters represented by the other little GECK's proceeding from the same home background (line 6'). We have in fact cycled back to the extreme left-hand end of the diagram, but for generation 2 instead of generation 1.

But the size of Tom's and Mary's family will feed back into their own development as parents. The larger their family, the greater their financial responsibilities for feeding, clothing, housing, entertaining, and educating their children. The greater these responsibilities, the more difficult will it be for them to save and accumulate property. The broken line 49 represents the fact that the larger is the number of their children the more difficult will it be for Tom and Mary to accumulate property during their married life. It is probable that they will in fact accumulate a smaller property. But this is not absolutely certain since, while their ability to save will be less, their motivation to save may be greater, since the larger the family the more

[1] In the diagram I have made this clear by numbering the relevant lines on the right-hand half of the diagram with the same numbers as the corresponding lines on the left-hand half of the diagram. Thus line 1 on the left-hand is numbered 1' on the right-hand half; and similarly for the other numbers.

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they must accumulate in order to be able to give each child an inheritance of any given absolute size. This increased motivation for saving is shown by the continuous line 50.

The size of their family will also affect their earnings. A large family may make it more difficult for Mary to go out to work and earn an income. On the other hand it will increase the need for income and may increase the parents' motivation to seek as high an income from work as they can manage to earn. The net result is uncertain and I have represented this by a solid line 51 which represents the number of children as increasing the motivation to earn income and a broken line 52 as reducing the mother's opportunities to earn income.

My diagram is complicated enough; but even so it is a great simplification of reality. There are causal relationships which I have omitted from my diagram. Thus I have not allowed for the fact that a man's genetic and educational background may affect his ability and his effort in investing his property so as to obtain the highest possible rate of return on it; nor have I allowed for the fact that a man may during his career invest resources in his own further education and training, his ability to do so depending upon the level of his income and property. It would be easy to add the arrowed lines to my diagrams which would represent these further positive feedbacks; I have refrained from doing so simply in order to keep the picture clear.

Moreover there are certain other very important relationships which are perhaps implied in my diagrams but which are not very clearly represented in them and which I have not discussed. Thus my diagram fails to bring out the fact that the endowments which parents can give to their children may compete with each other. The more money a parent invests in a child's formal education (E) the less he may be able to leave to him in the form of other income-earning property (K). Moreover, parents who apply their minds to the direct care, education, and amusement of their children at home may have less time and energy left for making money to leave to them.

Above all I have not discussed what determines the number of children which a set of parents will produce. It may well be that the structured genetic, educational, social, and economic characteristics of the parents do influence the size of their families, some types of family having on the average a larger number of children than others. But there would almost certainly be important dispersions around these characteristic

averages, the representation of which would need the intro-
duction of yet another 'luck' factor. I shall have something
to say later about the important effects of differential fertility
between different types of family; but I have nothing to say
about the *causes* of differential fertility. This is probably the
most important omission from the general scheme of relation-
ships which I am trying to put before you.

Finally, there is another very closely related demographic
consideration. My diagram is based on the assumption of the
permanent monogamous family in which Tom has children only
by Mary and Mary has children only by Tom. This is still
the basic pattern in our society, though the bonds of marriage
are looser than they used to be. In a society in which human
breeding pairs were frequently reshuffled the picture would
be very different. In particular I would need to modify sub-
stantially what I am about to say on the mating patterns of
husband and wife.

But let me return to my model with all its admitted de-
ficiencies. I have now discussed how Tom as a bachelor and
how Tom and Mary as a married couple develop the endow-
ments which they received from their parents, mingle them into
joint family endowments, and hand them on in turn to their
children. Let me next turn to the important question of the
factors which caused Tom and Mary to choose each other as
mates in the first place.

I have already argued that there are strong forces at work
in society causing the basic components of good or bad fortune—
genes, property, and social contacts—to become, highly cor-
related with each other; and I shall start my analysis of this
question by talking of the fortune of a man or woman as if
there were some single index of the amount of genetic–property–
social–contact 'fortune' which a man or a woman possessed at
the time of his or her marriage.

The fact that Tom Jones mingles his fortune with that of
Mary Smith before he transmits endowments to the next
generation will tend to limit the degree of inequalities in family
backgrounds   and   endowments   which   would   otherwise
develop.

Let us imagine all the eligible bachelors drawn up in a
strictly descending order of their fortunes and all the eligible
spinsters similarly drawn up in a strictly descending order of
their fortunes. We may say that there is perfect assortative
mating if the most fortunate bachelor married the most

fortunate spinster, the second most fortunate bachelor the second most fortunate spinster, and so on down the two lists.

In this case there would be no averaging of fortunes as the generations succeeded each other. But consider, simply as an intellectual exercise, what might be called perfect anti-assortative mating. Suppose that the most fortunate bachelor married the most unfortunate spinster, the second most fortunate bachelor the second most unfortunate spinster, and so on down the bachelors' list and up the spinsters' list. The net result would be a tendency for the complete averaging of family fortunes in one generation, each family ending up with the same joint fortune.[1]

Completely random mating may be defined as the case in which each pair of bachelor and spinster were drawn at random from the two lists.

In fact mating is somewhere between the completely random and the perfectly assortative. A bachelor at a given position in the bachelor's pecking order will not inevitably marry the spinster at the corresponding position in the spinster's pecking order; but the choice is not purely random; the nearer any given bachelor and any given spinster are to the same position in their two pecking orders the more likely they are to choose each other as mates.

But so long as mating is not perfectly assortative there is some averaging and equalizing tendency at work. If Tom's and Mary's fortunes do not correspond, then the joint family's fortune will be an average of whichever is the greater fortune and whichever is the lesser fortune. This is an equalizing tendency; and if this were the whole of the story, inequalities would progressively disappear as the generations succeeded each other. For as long as differences of fortune persisted there would be a force at work taking two different fortunes, joining them together, and averaging them. This force is known as the regression towards the mean. Exceptionally large fortunes would tend to be averaged with lower fortunes, and exceptionally low fortunes with higher fortunes. Fortunes would regress towards the average of fortunes.

If this regression towards the mean were the whole of the story we would expect to find society continually moving towards a more and more equal distribution of endowments. But there is another set of forces at work tending all the time

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[1] On the assumption that the fortunes of the bachelors and of the spinsters were symmetrically distributed.

to reintroduce inequalities, forces which we may call the forces of dispersion around the average. These forces are expressed in all the elements of luck to which I have drawn attention in my diagram—genetic luck (L_g), luck in education (L_e), luck in social contacts (L_c), luck in investments (L_i), and luck in one's work (L_w). If the genetic factors in ability were purely additive, then children would be likely on the average to inherit purely genetic factors for ability which were the average of their parents' genetic factors. But this is only an average. Unless they are identical twins, they will differ. Some will be lucky and some unlucky in the draw from their parents' pool of genes; and thus inequalities between the most and the least able in the family will be re-established. Moreover, in their careers some will strike lucky in education, social contacts, investments, and jobs and will go uphill, while others will go downhill.

The ultimate self-perpetuating degree of inequality in the distribution of fortunes can thus be seen as depending upon the interaction of three forces. The less assortative is mating, the greater will be the regression towards the mean, and thus the smaller the ultimate degree of inequality. But elements of random luck in genetic make-up, and in social and economic fortune cause a dispersion about the average; and the more marked are these elements, the greater will be the ultimate degree of inequality in society. Finally, the more marked are the positive feedbacks and the less marked the negative feedbacks in my diagram of structured developments of endowments, the greater the ultimate degree of inequalities.

So far I have spoken in terms of a composite single index of fortune. But for many purposes it is necessary to break it down into its components. Consider the effects of changes in social habits which modify previously rigid social barriers. Suppose that members of different social classes begin to meet more frequently in clubs, sports, and other institutions.

Such changes would almost certainly make mating less assortative in terms of property and social contacts. The child of propertied parents with useful social contacts would be more likely than before to meet the child of propertyless parents with less useful social contacts.

But as far as ability to earn is concerned, whether this be due to genetic or environmental luck, the change might lead to greater assortative mating. In particular the introduction of a system of higher education which was less structured according to social class would tend to bring boys and girls

together according to their intellectual ability. This would be particularly true of a university system which ceased to be a finishing school for the sons of gentlefolk and started to provide an education for the able sons and daughters of all classes. Only the able children of gentlefolk would get to the university where, for the first time, they would meet the selected able children of the working class—and this just at that impressionable age when it has been known for young men and young women to become fond of each other.

It would be tempting to conclude from this that such social changes might lead to a more equal distribution of property (as mating was less assortative according to property ownership) but a less equal distribution of earnings (as mating was more assortative according to those endowments which led to intellectual ability). But this overlooks the interconnections between the various endowments. High earnings lead to high incomes which enable large properties to be accumulated. It is possible, though not certain, that in the end the more unequal distribution of earning power leading to a more unequal chance of accumulating property would have so potent an effect in increasing inequalities in the ownership of properties that it would outweigh the equalizing effects on property of less assortative mating according to property ownership. The easier rise of the meritocratic élite and descent of the aristocratic dud might in the end increase the concentration of property as well as of income at the upper end, unless, of course, offset by governmental measures for the redistribution of income and wealth.

I turn to a second reason why we must distinguish between the different elements of good fortune. Until the new biologists have made further advances in their art, it will remain impossible for Tom and Mary Jones to control the genes which they pass on to their children. They cannot decide that little Richard shall inherit all the good genes and little Jane all the bad genes; little Richard and little Jane must both take part in the same lucky dip. But Tom and Mary Jones can decide that little Richard shall inherit all the family property while little Mary shall have none of it; and the laws and customs which regulate the inheritance of property can have a very important effect upon the ultimate degree of inequality in society.

One can illustrate this by means of the following artificial, but nevertheless suggestive exercise.[1] Imagine a society in

[1] Based on the analysis on page 63 of Professor A. B. Atkinson's *Unequal Shares*.

which there is no capital accumulation but a constant stock of property which passes by inheritance from generation to generation. Suppose this property to be shared initially in equal parcels among a privileged 5 per cent of the families. Suppose each set of parents in the community to produce the same number of children, equally divided in each family between boys and girls. Suppose every boy and girl to survive and to get married and to have in turn the same number of boys and girls as did their parents. If each family produces one son and one daughter, then the population will be constant. If each family produces 2 sons and 2 daughters, the population will grow, doubling in each generation.

We wish to watch the distribution of property as the generations succeed each other. The table illustrates the way in which the combination of the degree of assortative mating according to property ownership, the growth rate of the population, and the laws and customs affecting the inheritance of property will combine to affect the outcome.

	Percentage of population owning property			
	Perfect assortative mating		Completely random mating	
	Stationary population	Growing population	Stationary population	Growing population
Properties left to:				
1. First son (*or* first daughter)	Percentage constant	Percentage falls (absolute number constant)	Percentage constant	Percentage falls (absolute number constant)
2. First child whether son or daughter	Percentage falls rapidly towards zero (concentration on one family)		Percentage falls slowly towards zero (concentration on one family)	
3. All sons (*or* all daughters)	Percentage constant		Percentage constant	
4. All children whether sons or daughters	Percentage constant		Percentage rises towards 100 per cent (equality of ownership)	

In the first row of the table we consider the case in which parents always leave their property to the eldest son. In this case the absolute number of property owners each owning an

unchanged amount of property will remain unchanged, since each property owner leaves it all to one son, who leaves it all to one son, and so on *ad infinitum*. In a constant population the percentage of families owning property will, therefore, also remain constant. But in a growing population the constant number of property owners will come to represent a smaller and smaller proportion of the population, as all sons after the first son in each family join the growing ranks of those without property. The analysis would be exactly the same if all families always left all their property to the eldest daughter instead of the eldest son.

In the second row we consider as an instructive intellectual exercise what is probably an unusual set of laws and customs, namely that the whole property is left exclusively to the eldest child whether a boy or a girl. In this case whether the population be stationary or growing the ultimate outcome will be for the whole property of the community to be owned by one single individual. Two properties can in this case be joined together in holy matrimony, but once joined they can never be separated, since death does not part them. If an eldest daughter with a property marries an eldest son with a property, this becomes a single property which will be left to the eldest child of the marriage. If that child marries a propertyless spouse, the enlarged property remains unchanged; but if he or she in turn marries a propertied spouse, then the already enlarged property is enlarged still further into a still bigger single property.

This process of concentration will continue indefinitely; but the speed with which it occurs will depend upon the degree of assortative mating. If there were perfect assortative mating among property holders, there would be a tendency for the number of property holders to be halved in each generation, since at every generation a male property and a female property would be merged into a single property. If mating were perfectly random, the process of property meeting property would be much slower. But the inexorable final result would be the complete concentration of all properties into a single ownership.

In row 3 of the table I consider the case where only men own property but where, unlike row 1, the property is divided equally among all sons instead of being left only to the eldest son. In the case of the stationary population where each father has only one son, the effect in row 3 is identical with the effect in row 1. But where the population is growing there is a difference between rows 1 and 3. Where only eldest sons inherit, the

absolute number of families owning property will remain the same. Where all sons inherit, and where propertied and propertyless families are growing at the same rate, the percentage of families owning property will remain unchanged at its original 5 per cent. Once again the analysis would be unchanged if it was the daughters and not the sons who inherited the whole of the family property.

Neither in row 1 nor in row 3 does the degree of assortative mating have any effect upon the result. Indeed, the degree of assortative mating is in these cases meaningless; since either all women or all men are propertyless, there is no meaning to be attached to the degree to which men and women select spouses with properties similar to their own.

In row 4, however, the absence of perfect assortative mating is crucial. We consider now the case where properties are split up equally among all children, whether they be sons or daughters. If there were perfect assortative mating, properties would remain in the ownership of a privileged 5 per cent of the population as in row 3. It makes no difference whether a property is left only to the sons in a family, or whether it is left half to the sons and half to the daughters, provided that these sons and daughters take as spouses the similarly endowed daughters and sons of similarly propertied families. Whether a whole property passes from a father to his sons who then marry propertyless wives or whether a half property passes to his sons who then marry wives who have received a similar share of a similar half property makes no difference to the property which they can then hand on to their children.

But if mating is not perfectly assortative, the difference between rows 3 and 4 is decisive. When properties are divided equally between sons and daughters and when the propertied sons may marry the daughters of propertyless parents and the propertied daughters may marry the sons of propertyless families, properties will be spread over a larger and larger number of the population. In the end there will result a complete equalization of property ownership. If any properties of unequal size remained, sooner or later they would meet, marry, and be averaged before being left to the next generation. Inequalities could thus be reduced; they could never be reintroduced. The smaller the degree of assortative mating, the quicker the process of equalization.

I need hardly add that laws and customs relating to inheritance do not consist exclusively of one or other of these pure

forms. Moreover, of course, in the real world inequalities would be reintroduced and maintained by the accumulation of new properties and by all those factors of what I have called luck which lead to a dispersion about the average as new properties are accumulated; and the higher the degree of assortative mating according to properties, the greater the ultimate degree of inequality that will be sustained. In my artificial, mechanistic model of inheritance, I concentrated on a limited number of pure rules of inheritance, assumed that no new properties were accumulated, and omitted all the factors of dispersion which tend to restore inequalities solely to give an intuitive idea of the important underlying forces which over time the laws and customs of inheritance may be exerting in the background in society.

I introduced this discussion of the importance of laws and customs relating to the inheritance of property by pointing out that while parents could control the distribution of their property among their children, they could not control the distribution of their genes. There remains another very important reason for distinguishing between genetic inheritance and the inheritance of property. If Tom and Mary Jones decide to leave all their property to little Richard, they cannot leave any to little Jane as well. But if little Richard is lucky in the genes which he receives from his mother and father, this in no way reduces the chances of little Jane being equally lucky in the genetic draw. Or to put this in a somewhat different way, if a set of parents have four instead of two children, they can leave each child only one-quarter instead of one-half of their combined property; but they can endow each child with the same average genetic make-up however few or however many children they may have.

This distinction is of fundamental importance when we consider the effects of differential fertility upon inequalities of income and wealth.

Suppose that the fertility of the fortunate were to rise and that of the unfortunate were to fall. As I have already pointed out, the fortunate parents would probably be able to accumulate somewhat smaller properties since they would have to support more children (line 49 in my diagram) and, on the assumption that the custom was to leave property equally divided among all children in the family, these somewhat smaller properties would be split into a larger number of fragments (line 19′ in my diagram). Thus if parents have

more children, each child can inherit a smaller share of what is probably a smaller total property. Conversely the less fortunate families having a smaller number of children to support might be able to accumulate somewhat larger properties, and in any case whatever properties they did accumulate would be less liable to be split into small fragments on the death of the parents. The effect of the differential fertility would undoubtedly be to mitigate inequalities in the ownership of property.

But there would be no such tendency to equalize genetic endowment. Having a large number of children in no way diminishes a parent's total genetic stock nor does it mean that this stock must be split into smaller fragments. An increase in the fertility of the fortunate relative to that of the unfortunate may raise the average quality of genetic endowments. But to equalize genetic endowment one would need to reduce the fertility both of the exceptionally fortunate and of the exceptionally unfortunate relative to the fertility of those with average fortune.

Endowments in social contacts probably fall in this respect somewhere in between genetic and property endowments. There are certain elements of social contact and atmosphere in the home which, like genetic endowments, can be enjoyed by all the children in the family, however few or many they may be. There are others, like expenditure on educational and similar social contacts, which, like property, if spent on Richard cannot be spent on Jane. There are still other elements which are intermediate; to have four instead of two children probably means that each child gets somewhat less attention, but more than half as much, attention from his parents.

To conclude, my remarks on the various relationships which determine the transmission of personal endowments have, I fear, been rather disjointed; but I hope that I have said enough to make it clear that they are all interrelated in a rather complicated single biological–demographic–social–economic system.

In any case the analysis remains woefully incomplete unless one can estimate quantitatively the relative importance of the various factors. The difficulties of quantifying the relationships are immense. First, it is extremely difficult to get measurements of many of the relevant variables. For example, genetic endowment may affect many hitherto unmeasured characteristics which are economically much more important than the I.Q. scores which we can measure and which for that very reason have been so much examined. Second, the very marked

correlation between the various components of good and bad fortune which I have emphasized in this lecture itself makes quantitative measurement of the separate importance of each component statistically very difficult. Third, the very complexity of the intertwining of so many genetic, demographic, socio-logical, and economic factors raises very formidable problems for empirical research in this field.

In their recent book entitled *Inequality* Professor Jencks and his colleagues at Harvard claim to have shown that the factors which I have called luck are immensely more important in the explanation of inequalities between individuals than the struc-tured biological, demographic, social, and economic factors which I have called fortune and on which I have concentrated in this lecture.

This may well be so; and if it is so, it has very far-reaching implications for the design of policies if we want to reduce inequalities. Many people and not only Marxists have main-tained that we must rely more on structural changes in society's institutions which will basically readjust what I have called the structural endowments of good or bad fortune. But if Pro-fessor Jencks is correct, we should on the contrary rely less on factors of educational, social, and economic reform which will equalize people's structured fortunes in life and should rely more on a continuing direct day-to-day redistribution of the unequal incomes and properties which the chances of luck will continually be re-establishing in society. Such measures— for example, progressive taxation of incomes and property, negative income taxes, social dividends and other social bene-fits, minimum wage rates, free education and medicine—would be needed simply because of their immediate direct effect on the standards of the lucky and the unlucky within any one generation.

Perhaps in the present state of our knowledge we should put more emphasis on such direct measures. If Professor Jencks is correct, that is the only way. If he is incorrect, such measures, in addition to their immediate impact effect on the equalization of incomes and property within any one generation, will also help to set in motion in the right direction many of the self-reinforcing influences in society which I have catalogued in this lecture, since more equal incomes and properties may lead to somewhat more equal educational, social, and economic opportunities and thus, for what it is worth, to a more equal intergenerational transmission of endowments.

But I confess that I am disinclined to rush to this conclusion. I understand that the results of the many valuable empirical studies on these matters which have been and are being conducted are still to a considerable degree uncertain, controversial, and sometimes inconsistent with each other. There remains the possibility that fortune is not quite so secondary to luck as Professor Jencks considers it to be.

Thus something may still be gained from considering carefully those factors whose importance Professor Jencks is denying; for they really do at first sight appear to be very influential factors. Indeed, I must confess that I do find Professor Jencks's conclusions very surprising, although I have not the competence to criticize his sophisticated, careful, and scholarly statistical work.

I have already chosen an epitaph for inscription on my tombstone, namely: 'He tried in his time to be an economist; but common sense would keep breaking in.' It certainly is a useful irruption when common sense breaks into a sophisticated economic model to point out that the assumptions of the model simply rule out all the factors which casual empiricism suggests are important in the real world. But I cannot apply my common sense in that manner to Professor Jencks's work which covers comprehensively, but finds unimportant, all the main factors which my casual empiricism suggests to be important. Alas, common sense may imply no more than the conservative conventional wisdom which refuses to face new hard facts because they are disturbing. I know that in the end I must face the facts; but meanwhile I am surrendering to my common sense to the extent of preserving an open mind for just a little longer.

ACKNOWLEDGEMENTS