

KEYNES LECTURE IN ECONOMICS

TIME AND CHOICE

By G. L. S. SHACKLE

1. *Choice: the formal essentials*

CHOICE, as the name of something that men do, seems to involve three formal essentials: a set of elements distinct from each other; a standing which can be conferred on any one, but only one, of these elements; and an origin and mode of this conferment. In relation to that standing, the elements amongst which there is choice are thus mutually exclusive. I shall call them *rival choosables*. Then, what essential nature does the human condition, the Scheme of Things, prescribe for the rival choosables? What incentive does it offer for making choices? And what is the essential nature of the part played in choice by human capacities? This third question implies a quite fundamental choice which we ourselves, inquirers into choice, must make at the very outset by taste or temperament, but with decisive suggestion from the logic of things.

2. *Determinism incompatible with originative choice*

Determinism is the view that history in every particular from eternity to eternity exists independently of human knowledge or initiative. If so, choice is the empty name of an illusion. If so, the choices which are said to be made are themselves mere details of a fixed eventless picture, all of it co-existing and co-valid in some world uncognisant of time. Time itself is then a deception of the human consciousness, a blindness ordained for humanity requiring them to grope through an invisible field filled, none the less, with objects, objects vaguely guessable from their earlier encounters. If so, choices are not made. They exist. If they are not made, nothing can influence their making, their making can influence nothing. Nothing, indeed, is capable of being influenced. If such is the truth, what claim has choice upon our interest and intellectual exertion? As the receptacle of an interesting concept of choice, determinism will not do. What, then, instead?

3. *Non-determinism. The new. The void. The solitary present*

What notions are annihilated, what words are made meaningless, when we embrace the eternal stillness of determinism? They are the contradictories of stillness. In determinism, history is independent of thought. Determinism makes thought otiose. A negation of determinism makes thought the condition *sine qua non* of history, the thing without which human history would have no existence. In a non-determinist view, history is *the news*. In determinism nothing is new. In the negation of determinism, only that *is*, which is new. To be, is to be new, to be is to come into being, to take place. To be new is to take place in thought. To be new is to be in essence thought itself. In the view that negates determinism, to exist is to be new. It is thus to be cut off, both from those things whose newness, in an unseizable transience, has ceased and vanished, and from that void out of which, alone, new things can come, that void which, in conceiving the notion of the new, we are obliged also to conceive in the same thought, as part of the essence of the notion of newness. We have a name for this double cut-off, this isolation and solitariness of the sole existent, the new. We call it *the present*. The void indispensable to the possibility of newness, the notion of the void inseparable from the notion of newness? If all that takes place were the mere elaboration and implication of something else, of antecedents, we should be back in determinism. Non-determinism is obliged to envisage an origin and genesis *ex nihilo* for some elements or characters of what takes place. Whether we can go beyond these expressions, 'the void', 'ex nihilo', we shall briefly consider below.

4. *The contrast of time as a space and time as the transient present*

The contrast which in these foregoing sentences I am seeking to suggest is that of two incompatibles, two meanings of the word *being*. Determinism is history without humanity. Men and their roles appear in the still and complete (though perhaps infinite) picture as mere details on the same footing as all else. In such a view, time is the mere canvas on which the picture is painted. Time in this view is a space, a set of distinct but ordered locations where the pigments in their variety of form and colour are deposited. In this view, man must not cast himself as the painter even in the role of employed agent, even with the most limited discretion. He is a mere part of the painting, his very existence is his mere fixture in it. He has no *choice*. In absolute contrast, there is the notion of being as thought, and of thought

as a *transient*. Only that *is*, which is vanishing before our eyes in giving place to something new. Instead of saying that *being* means a wholly different thing, we can say that *time* does so. For in this contrasting view, time is the present, the ever-elusive moment within which there must, none the less for its unseizable brevity of passage, be 'room and time enough' for all thoughts of every kind in the most inclusive Cartesian or Russellian sense: all sensation, intellection, emotion, imagination, and decision. Determinism invokes infinity, eternity. Non-determinism looks at the moment, the present. But the present is not merely a small portion, an infinitesimal particle of something indefinitely more extensive. The essence of the present, the essential effect of our rejection of the view of history as something timelessly complete and indifferent to human postures, is to make possible the notion of transience.

5. *Transience, succession, the calendar-axis*

Transience, that existence consisting in arrival and departure, where arrival and departure are one and indivisible, by its nature would leave a void, were that void not continuously filled by a new transient present. Time as transience suggests continuity, yet by force of native intuition or grammatical expediency we make it in our discourse particulate. We speak of the *present moment*. The inquirer into time is bound to conform to that usage, if he is to be understood. And after all, the difficulty of verbalizing these gossamers of conception is so intense as to sanction any resource of language. The present moment is something which of its nature will have a successor. No one will expect me to say what is meant by *successor*. This term names a primitive notion not subject to analysis in other terms, an elemental building-block of discourse. Yet it has for all of us an indispensable and chiselled meaning, protean in circumstance yet constant in essence. Transience as the nature and essence of the present implies a successor of the present, will not that successor have a successor in its own kind, and so on unendingly? How are these successors to be accommodated in thought? In what work of formal imagination can they take their place? Transience has suggested succession, and succession has suggested the calendar-axis where the inferred, supposed, imagined succession of moments is conceived as a metric space and represented, in a million applications, as a straight line in a Cartesian system of co-ordinates. The human direct intuition of time is the transient present. Is not all else an invention, an artefact, a convenient

scheme for the arrangement of thoughts and a basis for a theory of Nature?

6. *Choice and the origination of history*

If we elect the non-determinist view, we cannot leave the matter there. If history is not the mere enactment of a stage-play whose every detail exists independently of our being shown its scenes and episodes in sequence, how does history come to pass, what gives it rise and form, what originates the course of things in step with their appearing to our senses and our minds? For the non-determinist view is that the origin of the stream of transformations which we perceive is immanent in that stream itself. Non-determinism is the view that the present shows us a process of creation. How do we suppose that such a process works? Evidently if our aim is to find a meaning for the word choice, a nature and essence for the notion we thus name, the generative process of history must be its locus. If choice means more than an illusion, it means the origination of history, an origination which is seeded in men's thoughts and germinates in their interactive deeds. If so, what kind of thing are the entities amongst which choice can be made? Why is it made? What is the source of the rival choosables, what presents them to the mind of the chooser, or how does he come to envisage them? What is implied by the two suppositions taken together, that choice *originates the new* and that it has effects and consequences visible and knowable to other minds? What is implied by the supposition that choice is effective? If choice is a source or origin in some fundamental sense, what is thus implied for men's power to know what will be the sequel of any specific chosen step of theirs? In a world of effective choice, what is the role of the notion of cause? These seven questions are my intended theme.

7. *Choice and cause*

If my experience has been that some specifiable difference between two sets of circumstances was always accompanied by some other specifiable difference, provided all the rest of the circumstances, other than these two, included in either set was matched in the other, I may be inclined to call one of these two differences the cause of the other. If one alteration of circumstance precedes the other in time-sequence, I shall regard that one as the cause. I may have other reasons for naming one difference the cause and the other the effect. Now if I assume that such an account of things could be given concerning every

transformation that I have observed or may observe, so that not only those circumstances which in any particular case are seen to change, but also those which form the background of the change, are deemed to be locked in a universal and all-pervasive system of causality, am I not back in a determinist world? To assume the universal determinate and precise operation of cause and effect, so that everything which takes place is the only thing which can take place, is to allow no meaning to the expression *rival choosables*, except that of a delusion. If all that takes place is implicit in what has taken place, there can be no rival possibilities in any context. Thus there can be no choice. Let us then consider the opposite of universal rigid and exact causation. If all bonds were dissolved and non-existent, so that any state of affairs which the world can be conceived to assume could be assumed by it no matter what had gone before, there might then be choosing on the part of individuals, but their choosing would be powerless and ineffective. We may go further, and say that in a world of the anarchy of Nature no publicly visible expression or physical embodiment of the act of choice could take place. Thought would be not only powerless but dumb. Causation deemed to be rigid and universal, causation deemed to be entirely absent, seem alike fatal to any interesting notion of choice.

If when a man elects one out of several rival steps of action which were present to his thought, we claim that this choosing is a source from which some aspects of subsequent history will flow, we are claiming that the history would have been different had his choice of action been different. We are thus claiming that his choice is a cause and some aspects of history an effect, within the meaning of cause and effect which we have adopted in the foregoing. If we do not recognize the notion of cause and effect, in some such interpretation as I have sought to express, how can we claim that choice is effective, that it is an origin of history? Yet, if we claim that cause and effect operate universally, we are saying that thoughts also are caused, and that choice is a mere link in a chain of causation. We are then saying that choice is not spontaneous, is not a manifestation of human freedom, has no part in the *creation* of history, and lacks all the character which our unexamined habits of thought and speech, by which we live from hour to hour, implicitly assign to it. The pursuit of a notion of choice which satisfies men's sense of their own dignity; which puts upon them a not delusive responsibility; which allows them to feel that the burdens of anxious

decision are not placed upon them for nothing, that does not make a mockery of self-discipline, of effort, of seemingly creative endeavour; this pursuit confronts us with dilemmas and with the need for audacities of thought, even for what may seem perversities of thought, which go against the grain of much that is inculcated into us in the scientific and technological environment. If we subscribe to the uniformity of Nature, can we accept the operation of causes in one part of it and deny it in another? And yet, if we cannot, what of choice?

8. *Origin and uncause*

Whatever view we take of the nature of history and of the universe which enacts, suffers, or embodies it, there will remain a question which eludes thought, let alone verbal formulation, let alone the finding of an answer. In cosmology the alternative hypotheses are offered of the big bang or the steady state. In the steady state we are obliged to contemplate the continual creation of hydrogen atoms *ex nihilo* to make good the continual evacuation of space by the mutual retreat of the galaxies. But in the big bang hypothesis, how are we better off? Is there not still the question, what was the origin of the primeval atom? The ultimate question of *origin* is surely beyond reach. Determinism suggests an origin 'before history', outside of history. But what obliges us to deem the origin to be so dissociated from what is originated? Can we not conceive of a continuous origination? If a conception of the origin is denied to human capacities, are we not thereby permitted to suppose that human thoughts can arise in some part, in some degree, *ex nihilo*? That they are, if you wish, part of a continuing creation? Such a supposition is compatible with a large and indispensable role of suggestion. The role of suggestion in the engenderment of history has, I think, been much neglected. There are many masks which a hypothesis of continuing creation can wear. We may speak of randomness, of inspiration. These phrases name, they do not explain. What they name, however, would free us from the fetters of complete determinate causation of thoughts, would free us from the abolition of inceptive choice, of choice in the sense of an *origin of the new*. For that is not new, which is wholly implicit in the antecedents. What is wholly implicit in the combination of natural principles with the particular existent circumstances is, in principle, calculable, foreknowable. By the new I mean the *unforeknowable*. I do not think an argument is condemned by its resort to the notion of an *origin not explainable*.

Men's pride in reason is reflected in their imprisonment in reason. Reason is analysis, the breaking down of everything into something else. If this proceeding is deemed to be an infinite regress, there must be some practical limit to its useful pursuit. If it is deemed to have a limit in the nature of the human condition, then again it must end. In either case I think we are defended against those who deny to the notion of the *uncaused* any place in scholarly discourse. Let them acknowledge that the gates of my argument are wide open to the large, unforeknowable role of suggestion. If thoughts are in some degree liberated from cause, choice is rescued from being empty illusion. But this mode of rescue has fundamental consequences.

9. *Two rubrics: news of what is, imagination of the possible*

My business is to infer the nature of choice from postulates which make it the continuous creator of history. The question at the heart of that business is the nature and origin of the rival choosables.

Descartes distinguished between *res cogitans* and *res extensa*. Let us mean by these expressions that which has thoughts and that which supplies the field of those thoughts, which offers elemental suggestions from which those thoughts can be composed. These elements are put together under two rubrics. There are the compositions which purport to describe the circumstances of the present, which report what is taking place, which are *the news*; and there are those which abstract formal elements from the field as the means for work of imagination, which describe circumstances of the field as, in some sense, they *might be*. 'They might be'. In what sense? If the individual mind, the chooser, knows of nothing in the nature or the posture of things, nothing of principle or circumstance, which fatally obstructs some imagined set of circumstances from becoming a description of some present, that set is for him possible. Let us call the two rubrics, that is to say, the purported description of the present and the imagination of the possible, respectively, *present fact* and *possible history-to-come*. Can present fact offer rival choosables? Can any components into which we may resolve it be mutually exclusive? Or can there be for any individual more than one description of the present as a whole? Despite some profound speculations, such as those of Gödel, which allow us to question the one-ness and self-consistency of the field, we in practice deem the reports of present fact to refer to a unique and self-consistent whole. Any parts into which we conceptually divide this

whole are compatible and co-valid co-existents, they are not rivals, they cannot offer choice. Things which are *news* are already beyond the reach of choice, in our terms they are fact. Fact is that which has already chosen itself. The choosables are not presented by the field direct and ready-made, they are not components of *what is*, they do not exist independently of the chooser, they are the poems of his own imagination, poems in a very literal sense, things made by himself. In some essential sense the chooser must *originate* the choosables. It is in this origination that we find, I think, a possible conception of non-determinism.

10. *Imagined histories-to-come: an infinitely extensible plurality*

The history which we are deeming to be created by *choice* is the history of *res extensa*, the history of the field which we suppose to be the common source of suggestions variously coming to individuals as reports of *what is*, as *the news*. That history, we are supposing, is created by *res cogitans*, and originates in the thoughts men have under our second rubric, the rubric of imaginative composition. What, then, is the link between the work of imagination, the work of originative thought, and the things that take place in the field? That link presents itself, as soon as we think about it, as a matter of the most extreme elusive subtlety and complexity. The task of the individual imagination at all moments is to fill the void of time-to-come. Can the history-to-come which it conceives be a unique, self-coherent, unified processional image? Can a man find in his knowledge of general principles or of prevailing circumstances a fatal obstacle to every imaginable course of history in time-to-come, except one? The question answers itself by the merest glance at our universal experience, let alone the consideration of the overwhelming depth of detail in a fathomless universe of affairs which, at the very least, would evidently be required even if calculation were basically possible. But we need not appeal to experience or to the absurdities of the practical task. We have already excluded it in logic. If men's choices are inceptive this means that they are not wholly grounded and implicit in their antecedents, they are not implied in the present and what can be known of it, they are not implicit in its summation and suggestion of what is already the past. Inceptive choice brings in essential novelty, the unforeknowable. But unknowable choices to come will help to create circumstance-to-come, and that circumstance will influence the sequel of choices made in the present. The imagin-

able histories-to-come are necessarily a skein of many rivals. Will the business of composing such histories enjoy a boundless freedom? Of course it will not. The business is not undertaken for nothing. What is choice for? What can choice do? It can produce a *good state of mind*, the enjoyment of realizable ambitions by anticipation. But if those ambitions are to be realizable in thought (they cannot, at the moment of composition, be realized in fact, for they are the imaginative content of time-to-come) they must conform to the world as the chooser sees it, they must pass a test imposed by *practical conscience* for compatibility with the principles of Nature and of human nature, and with these principles in their application to the circumstances of the chooser's present, the posture of things present to his thought. That posture, however, involves the thinking being as well as his field of contemplation. For an element in that posture is the moves that he himself envisages that he will make. What must we mean by the delicately chosen word *envisages*?

II. *Moves and effects*

Any history-to-come which the chooser composes will, if it is to be of concern and interest to him, include moves of his own. These moves will, in the grammatical sense, be transitive, in them he will move *something*. He will move resources from one line of activity to another, he will transform the orientation of his capital equipment, of his armies or his fleets, of the minds and spirits of his congregation, the thoughts of his hearers or his readers. To envisage such action he must suppose, for each imagined path of history, that the things to be moved will be within his reach. To bring them within reach, the history in question must be suitably designed, its course must be an organic march from one move to another, each move contributing to provide the 'movables' of subsequent moves. The plurality of such rival histories will multiply at innumerable stages. But is not this conception a thing of immeasurable and ineffable complexity? Can we give it any intelligible form?

The thoughts of the chooser when he deems himself an originator of history, even on that small scale to which his capacities, his resources, and his suggestive reach confine his imagination and his practical conscience, will not be directed to particulars and precise proper-named details. His thoughts must engage with a hierarchy and a classificatory system of formal and symbolic notions of action. What sort of thing can he put to the test? What can he, as it were, put his money on? If for a moment

we pursue the horse-racing metaphor, what he can put his money on is not an exact description of every movement and momentary location of the horse's limbs, from its arrival at the race-course to its passing the final post, every endeavour of the jockey and exhortation by the crowd, every gust of wind or squall of rain. Such descriptions are not the items which appear in the card of runners, or even in the tipster's analysis. What carries the punter's money, within the punter's thoughts, is a symbol, a general, formal notion of a horse and of his jockey's and his trainer's skills and of the pedigree which has provided them with the physical means of exploiting those skills. This formal scheme, only identified by the proper name of the horse and of the two or three human beings, the race-course, and the date, is what carries the punter's money in his thoughts. The enterprise which a business man conceives, the almost physiological organism of land, plant, technological systems, men of every kind and degree of knowledge and capacity, the environment of fashion, politics, and seething technological advance in which its powers must be tested, is different only in complexity and the stretch of time involved, from the race-horse and his endeavour. Such complexity and the necessity to encapsulate it in symbolic forms and phrases imports into the very scheme of inceptive action itself, which is the immediately operative part of the choosable, that plural rivalry of ideas which we have described as an inherent character of the *sequels* of choice. In truth, the vessel of hopes, the race-horse or the business enterprise, the political campaign, the programme of research in natural science, the writing of a play or of a poem, the tide of musical excitement which launches the composition of a symphony, is joined by a continuous transition with imagination of the testing of these hopes, the histories-to-come which they bring into the field of the possible. The *choosable*, the imagined thing and thought-construct which contends in rivalry in the chooser's mind with others of its kind, encompasses both means and ends. The skein of rival strands, however infinitely its potential proliferation multiplies with contemplation of more-and-more distant epochs-to-come, extends from the very threshold of that time and is the texture of its content even in the most immediate impending moments. A contemplated step of action in our sense is a *class* of actions, a scheme of such steps is a *class* of configurations of classes of actions. Throughout the imagined thing, the choosable, from the chooser's present moment to every stage of the infinitely time-extensible history to come, there is plurality, rivalry, and

uncertainty. Plurality would be irrelevant without possibility: histories-to-come deemed impossible are of no concern to the chooser. Without rivalry, mutual exclusiveness, there is no need of choice. Where there are rival acknowledged possibilities there is uncertainty, unknowledge. *Possibility* is here the master-thread which binds all else together. Choice in my sense pre-supposes the endless origination of possibilities, and it is exposure to this or that member of a potentially limitless set of mutually rival skeins each composed of endless rival possibilities that in principle choice offers us. What the choosing of an action-scheme can do, is to make some desired imagined paths of history possible, in my subjective sense, at the cost of making some counter-desired imagined paths also possible. Choice can place defences against misfortune, but ultimately such defences are also obstructions against success. A different choice will remove the defence in removing the obstruction. This is the practical bearing and essence of uncertainty, which I claim belongs essentially and fundamentally to the nature of choice.

A choosable, I have been suggesting, even in those parts of it concerned with immediate time-to-come, will comprise plural rival imagined strands of history, each strand including some formalized and symbolic notions of actions of the chooser's own. Some such actions will seem to him unquestionably within his power, provided they are conceived to be taken immediately or nearly so. I have been calling these actions *steps*. The steps belonging to any one choosable's immediate foreground of time-to-come will compose a coherent scheme, even though that scheme may comprise plural rival variants. Thus I shall refer to that part of a choosable, which forms in some sense a bridge between the act of imagination and the unfolding of its first effects, as an action-scheme. So long as a choosable is still a choosable, so long as it is still able to be *rejected*, the action-scheme which forms its first stage is imagined only. Choice of 'what to do', choice of an action-scheme, thus stands in utter contrast to the notion of an election amongst a set of elements given to the chooser independently of his own thought, presented complete in fixed, exact, and fully known character and implications. The business of gathering suggestions from the field, of composing in their light histories-to-come as rival paths multiplying themselves, in principle, indefinitely with increasing remoteness of time, stretching indefinitely along the calendar-axis, is I think poorly represented by the word choice. I am obliged to put an extraordinary burden on this

word, but I wish to retain the link it offers with more conventional ideas.

12. *Possibility, desiredness, and influence of hypotheses upon choice*

I have sought to infer from the inescapable condition of men, that is to say, the necessity they are under to create the history-to-come by continual choice of steps of action in face of a void of knowledge concerning the circumstances-to-come which will shape the sequel of any such choice, the essential nature of the rival choosable entities. Each such choosable, I am led to suppose, must be a skein of rival figmental histories-to-come, each such history having two characters which govern its influence on the choice. Each imagined history must in the first place, as a condition of its entering at all into the business of choice, be deemed in some degree possible, that is to say, it must be deemed not fatally obstructed by anything in the chooser's thought. Each imagined history deemed possible will, secondly, be in some degree desired or counter-desired by the chooser. All that his act of choice can immediately do for him is to expose him to one or other of the mutually rival skeins of rival possibilities which, up to this point in an endless business of imaginative creation, he has faced himself with. In one such skein, the worst of the imagined histories-to-come will be worse than the worst in some other skein, but its best may be better than the best in that other skein. Neither of the two skeins is then *prima facie* superior to the other in the chooser's esteem. Such situations will inevitably emerge from a process of elimination of those skeins which are inferior on all counts. Into the business of arriving at this stage of the comparisons there has entered both of the characters of each individual imagined history, its *desiredness* and its *possibility*. Both, let me insist or admit once more, are characters of the thought of the chooser, they are in this sense subjective, personal feelings or judgements. How, otherwise, could we claim that they help to create the history-to-come in a manner not wholly implicit in the history which is past? But if both desiredness and adjudged possibility contribute to the influential force of each figment, how do these two characters bear upon each other, what is the claim of each to contribute to that force, what conceptual frame will display to us the system which all these influences compose?

13. *A formal frame*

In taking for my title two words, Time and Choice, of such

boundless suggestion and fundamental presence in all discussion of human affairs, I have felt it necessary until now to use the most general and capacious frame of terms and ideas that I could compass. But now we approach a task which I may call technical. The inexpressible elusiveness of thought must be abstracted from by means of a manipulable set of ideas and symbols, to each of which we can give distinct and rather simple properties. 'Force of influence' must be represented by a variable in the mathematical sense, and it must be treated in that sense as a function of other variables. Despite the continuous gradation of plurality and uncertainty throughout the time-stretch of each choosable, which I have suggested, I shall for simplicity speak of each choosable as composed of an action-scheme and its imagined sequels. I shall at first deem the chooser to be able to construct a private scale on which the desiredness of any specified sequel can be located by him. Thus 'desiredness' will for us at first be a *measurable* represented by an (arbitrary) numerical scale. It will be evident, I think, that any interval on this scale, stated as to length and position, can be occupied by an unlimited number of distinct sequels. In other words, any degree of desiredness can seem to correspond to, or be conceivably attainable by, any number of different sequels or histories to come. In saying that it can be, I mean that there is no formal and general obstacle in logic why this cannot be the case. If all the sequels which the chooser has imagined for some one action-scheme are looked on by him as perfectly possible, I say that his concern will be only with the questions: How desirable is the most desirable of these sequels, how counter-desirable is the most counter-desirable of these sequels? Let us remind ourselves that the direct incentive for his undertaking the business of choice is a state of mind, the *enjoyment by anticipation* of imagined histories-to-come. If all the sequels which he entertains, at some moment of choice, for some one choosable are for him equally possible, will not the state of mind engendered by this choosable depend solely on what it offers, at best and at worst? The issue is an essential and crucial one.

14. *Possibilities not combinable*

Can the chooser's esteem for any choosable action-system be increased by the presence in his thought of a larger number of sequels all affording like high degrees of desiredness? If a specific degree of enjoyment by anticipation is *made possible* by one sequel, will it be made *more possible* by the presence of other *rival*

sequels? I say that it will not. Possibility, in my sense, is the absence of obstacles. An obstacle cannot be absent twice, or several times, over. It requires only one sequel to remove the obstacles to a given degree of enjoyment by anticipation. To suppose that many rival sequels can render *more possible* the anticipation of a given degree of desiredness, whose anticipation is made *perfectly possible* by any one of these sequels, seems to me fallacious. It is an illicit transfer, to the question of *possibility*, of a mode of thought (itself questionable) derived from the frequency interpretation of *probability*. This vital matter I will touch on below.

15. *Focus points*

From the foregoing argument it follows that, under our present supposition that the sequels imagined for some one choosable system are all of equal possibility, the degree of desiredness offered at best by the system is simply that of the most desired of these sequels. The desiredness of this best sequel represents the utmost degree of desiredness which the system and its skein of imagined sequels as a whole can offer. What of its sequels of lesser desiredness than this one? One of them is as essential to the matter of choice as that sequel whose desiredness is greatest. This other relevant sequel is that of greatest counter-desiredness. If that choosable system which the chooser is assessing is to claim the desiredness of its most desired attributed sequel, it must equally assume the burden of its most counter-desired sequel. Have we not here an incoherence, an assertion that a choosable, an action-system, is to be evaluated by reference to both of two mutually conflicting and contradictory suppositions? Indeed we have, and this is the direct, necessary, and essential reflection of that *uncertainty* which flows, in the nature of things, from inceptive, non-implicit choice. Those two imagined sequels, the best and the worst among the possible sequels, on our present supposition of equal possibility of all sequels will be the only ones relevant to choice. We have already argued that no piling-up of supernumerary sequels of given desiredness and all of equal possibility can increase the possibility of that degree of desiredness. Let me now argue that no sequels of lesser desiredness than the most desired, but of equal possibility with it, can be of concern to the chooser. The argument is the same as that concerning sequels of equal desiredness with the best. Even if the inferior sequels were not inferior, they would do nothing to alter the situation constituted by a given greatest

degree of desiredness associated with, sanctioned by, a given degree of assigned possibility. A parallel argument shows that only the most counter-desired of a set of counter-desired sequels all of equal possibility is of concern to the chooser. This, the most counter-desired sequel, is the one which determines the degree of counter-desiredness of the worst threat which seems to be offered by the choosable system in question.

In order to suggest that these two points on the desiredness scale: that of the most-desired of the possible sequels and that of the most counter-desired, were the two on which the chooser's concern and attention would be exclusively concentrated, I have usually called them *focus-points*. I have now to extend the argument to include those cases where the chooser, in contemplating some one choosable system, entertains for it imagined sequels of various degrees of assigned possibility. For this we need a second axis of co-ordinates, orthogonal to the axis of desiredness, on which we can represent degrees of possibility. However, it is convenient to express those degrees by means of a variable which increases in the opposite sense of the axis to possibility itself, in order that perfect possibility may be represented by a zero numerical value of this variable.

16. *An inverted measure of possibility*

Perfect possibility is something utterly different from certainty. The chooser, in assigning perfect possibility to any hypothesized sequel, does not mean that he has positive belief in its eventual actuality, he means that he *does not disbelieve* in this eventual actualizing. Perfect possibility is zero disbelief. I am therefore led to express possibility by a variable whose content is disbelief. This variable may be taken to range from zero up to an absolute maximum representing total disbelief, that is to say, entire adjudged impossibility. Will not an imagined sequel which is assigned a lesser possibility than another of equal desiredness have less interest for the chooser than that other? If so, our frame of reference can be completed by a third axis representing the power of any sequel, in virtue of its desiredness and its possibility, to claim the chooser's interest when considered by itself. Let me call this power *ascendancy*. The ascendancy of any sequel will be an increasing function of that sequel's desiredness and a decreasing function of its assigned disbelief, its obstructedness. Likewise it will, in a different range of the desiredness-counter-desiredness axis, be an increasing function of the counter-desiredness of a sequel which is counter-desired, and again a decreasing function

of its assigned disbelief. It may now seem appropriate to re-interpret the term focus-points to mean two points, associated with some one choosable system, whose ascendancy is greater than that of other desired or, respectively, counter-desired sequels.

17. *Endlessness of potential origination of sequels, and the nature of epistemic standing*

Let us now return to the matter of the number of sequels, that is, paths of history-to-come, which can be conceived by the chooser as flowing from some one choosable system of action and accorded by him some greater-than-zero possibility. I suggested that because any one such path must incorporate at countless points the choices-to-come to be made by others, and because the character of what will be chosen cannot, in the nature of choice as we are understanding that term, be foreknown by anyone, the number of variant imaginable and possible paths is in principle unlimited. The number of such paths that the chooser will have envisaged, at any moment when choice has to be made, will be finite. But this does not entitle him to treat the list of those he has already envisaged in some degree of specificness as *complete* nor as *completeable*. Is he not thus debarred from assigning to the members of the list, values of any variable whose assigned values all taken together must by their meaning sum to a definite total? This difficulty is one of the two which we principally avoid when we resort to possibility, rather than probability, as the expression of epistemic standing accorded by the chooser to imagined sequels of any choosable action-system. For perfect possibility, that is, complete epistemic unobstructedness allowing *zero disbelief*, can be assigned to any number of rivals at the same time. Probability by contrast must be regarded as *distributed* over the members of some list which, to make sense of such distribution, must not be treated as indefinitely extensible.

18. *Characters of probability*

In its most general and inclusive meaning, probability names a class of interpretations of epistemic standing (in the sense we have sought to suggest for that term) which have one very important character in common. These interpretations all indicate the degree of that standing, if such indication is possible, by means of a variable which increases in degree or numerical value with any improvement in the epistemic standing of the proposition in question. This is not a merely formal matter. For

while freedom from recognized obstacles is something which can be enjoyed in common by any number of rival hypotheses or propositions, and for which, therefore, they are not in formal competition with each other, this cannot be true of a variable whose increasing numerical values indicate, for any proposition to which they are assigned, an approach towards *certainty*. Whether higher probabilities are held to mean higher relative frequencies of occurrence, a higher degree of rational belief, a stronger confirmation, or any source or sign of positive confidence, the increase of this kind of standing for one proposition must imply its decrease for some of the rivals of that proposition. In the extreme, a proposition which is held to be *certain* necessarily excludes any degree of acceptance, other than zero, for propositions which are its rivals; that is to say, propositions whose truth would deny the truth of the one in question. A proposition, a hypothesis, a suggested answer to some questions, which is deemed to be perfectly possible, may stand alone in that adjudgement, or may be one of many mutually exclusive propositions, or one of a list of such mutual exclusives which seems in principle to be capable of endless extension. But a proposition which is deemed to be certainly true, cannot allow any truth to propositions which contradict it. Certainty, whatever nature we assign to it, must be in some sense, on some principle, by some procedure, *shared* amongst rivals if these present themselves and cannot be excluded. Probability, whatever basis we adopt for it, is a *distributional* measure or indicator of epistemic standing. It seems to me inappropriate and inapplicable to a situation where rival propositions (for example, the rival sequels imagined for some system of action) are in the nature of things an infinitely extensible list. Let me consider a question which may here suggest itself. Choice must be made at the moment which circumstances propose. There is a deadline. There will not be time (how could there ever be?) for the chooser to compose, for each rival choosable action-scheme which he has envisaged, an infinite list of rival sequels. The notion of an infinite list contradicts the notion of the *completion* of such a list. Will it not then be appropriate and permissible for the chooser to treat the list so far as he has gone with it *as if* it were complete? To do so will, I think, be plainly fallacious. If I know the names of only some of the horses entered for a race, it will not do to treat the sub-set whose names I do know as though the winner were bound to be found amongst them.

The association of the various notions of probability with the

notion of *lack of knowledge*, with the notion of *unknowledge*, is a strange one in origin and nature. We are asked to believe that by some juggling, the insufficiency of an available body of knowledge to establish a one-one correspondence between choosable actions and their sequels can be abolished or disregarded. Broadly it may be said that there are two proposed methods for this. One is to treat that *knowledge* which statistical probability provides concerning some *class of instances taken as one whole*, as applicable to single instances each taken on its own. The other method, proposed, for example, by Leibniz and by Maynard Keynes, is to suppose that reason, though insufficiently provided with evidence for the construction of a demonstrative proof of some proposition, can none the less inform us that that proposition has a better or a poorer claim on our belief. Are we not obliged to ask: If a body of knowledge is, for some purpose, insufficient, if it exhibits a *gap*, what means or justification have we for ignoring that gap, for declaring the contents which, if we were better informed, might fill that gap and make the body of knowledge complete for the purpose in hand, to be unimportant in some degree? There seems here to be a contradiction. Either the needed knowledge is partly not there, not available, or else the knowledge which is present is only superficially incomplete, and can be made visibly complete by reasoning from what is explicitly known. How can we have it both ways? At the head of his first chapter, Keynes quotes a sentence from Leibniz in his support. Leibniz was a philosopher of boundless audacity and intellectual ambition. Keynes also was a mind of untrammelled daring. Can it not perhaps be, that in this matter of probability they over-reached themselves? Keynes denies that his conception of probability involves anything subjective except the specification of that body of evidence which is to be deemed relevant. I would venture to say that the notion of degree of rational belief can be salvaged only by invoking an act of creative invention and subjective, non-demonstrable judgement. The assessor can ask himself: What additional postulates or evidence would render my existing body of knowledge sufficient for demonstrative proof of the proposition I am considering? and: How difficult, in some sense, how lacking in intellectual respectability, how much against the grain of practical conscience, is the invention, the figmentation, of such suppositional extra 'evidence'?

Degree of rational belief, in the sense which Leibniz adumbrated and Keynes tried to establish, when considered as a means of expression of epistemic standing where that standing

cannot amount to certainty, has one great virtue. Its applicability is not confined to the assessment of classes, each class treated indivisibly as one whole, of numerous instances all arising in a specified set of conditions of bounded variability. By contrast, it applies to a single proposition. When a frequency-ratio is assumed to throw light on the question: What will be the result of the single, indivisible, identified, 'proper-named' instance of some sort of trial which I am about to make, such as the throwing of two dice at one go, are we not obliged to ask what our attitude will be when we can compare *ex post facto* the actual result with any particular hypothetical result on which our attention had been fixed beforehand? Suppose that before making such an identified, proper-named trial, say the throwing of two dice together at 8 a.m. on 29 September 1975, I have before me a table showing how many ways, out of the thirty-six different ways in which the two dice can fall in regard to the faces which lie uppermost, will show a total of two dots, three dots, and so on up to twelve dots. If, when the trial has been made, I see a total, say, of five dots, what relation can I claim to find between the table and this result? Does the result confirm the table? Does the result dis-confirm the table? Plainly it does neither. Did the table tell me beforehand what the result would be? Plainly it did not. What the table did purport to tell me was that if I were to make say, three thousand six hundred throws of the two dice, a table of the realized results would bear some recognizable resemblance to the frequency-table arrived at in advance. Statistical frequencies (whether obtained by inspection of structure or by experiment) are *knowledge*. They are knowledge which cannot claim to be exact. What knowledge can claim to be exact? Perhaps only that of the positional astronomer. But we are not now seeking a means of knowledge, but a means of *expressing attitudes to unknowledge*. The means I have been for many years suggesting, the notion of possibility treated as the absence, complete or in some degree imperfect, of any obstacle within the assessor's knowledge, can evidently apply to single propositions or to single instances. If we take one further step we can make a further claim of some interest.

19. *Epistemic standing as a variable of feeling*

Above I proposed a system of three co-ordinate axes, one of which would represent possibility. How are degrees of possibility to be assessed or expressed so as to be locatable on a scale? If we turn for this purpose to the nature of the obstacles which are

the source or basis of judgements of imperfect possibility, we shall find of course that they show an unlimited diversity which seems to offer no hope of any common measure. However, the variables measured on the other two axes are *variables of feeling*. They are *desiredness* and *ascendancy*, the latter being the power of some kinds of ideas to gain the individual's attention and perhaps thus influence his choice. It may well seem that our third axis ought likewise to be occupied by a variable of feeling, and there is in universal experience a feeling which exhibits degrees of greater or less intensity, and which arises solely from cognitive situations, namely, from the comparison of what was imagined *ex ante* with what has appeared *ex post*. The feeling of *surprise* expresses by its degrees the degree to which possibility has been misjudged. If something presents itself in 'the news', the reports of *what is*, despite having been hitherto dismissed as impossible, that even will cause a high degree of surprise. The falsifying of lesser supposed obstacles will engender less surprise. The potential surprise to which the chooser exposes himself by an adjudgement of possibility may serve as a variable of feeling to represent possibility on our third axis.

20. *Choosables as originated vectors of non-coherent possibilities*

At the outset of my lecture I proposed that in face of the perennial question of determinism or non-determinism we should feel free to make an election between the two hypotheses on grounds of the fertility of each in leading to interesting argument and further speculation. On this ground, or with this defence, I rejected determinism for the purpose of my enquiry into the fibre and fabric of the concept of choice. The economist often pretends to discuss choice, but his meaning for this word is the determinate response of men with given desires to their assumedly fully-known circumstances. Choice would then be the mere clicking of the machine as it works, or a mere fleck of pigment in the still picture of eternity. The theme which has flowed (if I may so dignify my thoughts) from that rejection has led to a view of human affairs which some of you will dismiss as an extreme subjectivism entirely abhorrent to the scientific outlook. Science searches for cause and effect. Cause and effect are indispensable to my argument, but only subject to the exemption of thought itself from entire governance by influences outside itself. Let the statistician interpret me as meaning that thought can be random, let the poet understand me as saying that thought can be inspired.

I have suggested to you a meaning for the word choice which may seem to discard entirely the content that either conversational usage or rigorous discourse has given it. The fundamental difference between my conception and the orthodox notions is my insistence that choice is a business conducted in face of a void of knowledge, that void which simply expresses the non-existence of what the knowledge would be knowledge of. Choice cannot have knowledge of the pre-existing contents of its field, because those contents are the very thing which it is the business of choice to create, to originate. Nor can the chooser foreknow what the sequel of his present choice will be, for if his own choices are inceptive, if his own choices are non-implicit, in some degree, in their antecedents, so are the choices of others and so are all the choices-to-come of himself as well as others. But these choices-to-come, unknown though their sequels will essentially be to those who will make them, will supply in part the circumstances shaping the sequel of choices made now. Inceptive choice is choice made (because of the nature of *other* inceptive choices-to-come) without knowledge of a precisely described, uniquely possible sequel, for *there is no such uniqueness*. Inceptive choice at best can only expose the chooser to a skein of rival possibilities, a skein with which he represents to himself as well as he can the real indeterminacy of the history-to-come which will affect him. With a different choice, this skein would be a different one. Choice makes a difference, but this difference, for the chooser when he makes his choice, is between one set of permissible imaginations and another. If each choosable offers rival sequels, some desired and some counter-desired, how can comparison of the choosables be made? Can such a question be evaded? It cannot, for in the essential nature of choice we discern uncertainty, and uncertainty is the entertaining of rival, mutually incompatible answers to one and the same question. Can rival action-schemes be compared on such a basis? A mundane illustration offers itself. When a man makes a bet, he deliberately exposes himself to the possibility of a loss, a loss which he could have excluded. He does so for the sake of exposing himself by the same act to the possibility of gain. The two hypotheses, that he will lose and that he will win, are mutually contradictory, yet he must weigh against each other the two mutually incompatible anticipations, and he must weigh against each other *different* available wagers, different pairs of incompatibles. Can it be denied that he does so?