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CHAPTER VI.

Skill and Connoisseurship.

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Our reliance on the exact empirical sciences has been shown to imply the acceptance of a varied assortment of personal facts; so that to this extent these sciences may be classed with such formalisms as those of pure mathematics, of works of art or of religious practices, which are capable of validation but not of verification. The present ^{lecture} ~~chapter~~ carries the survey of our personal knowledge further, beyond the facts controlled by any definite formalism into the domain of skills and connoisseurships. ~~The process of accrediting them can no longer refer~~ to ^{any} correspondence between a fixed formal framework and the actual ~~variable~~ instances of our experience but must seek its justification largely or entirely within a personal act of ~~the mind.~~ ^{our own mind.} We shall find accordingly, that our commitment to the exercise of skills and to the practice of connoisseurship is inherent in the structure of these performances, which necessarily makes us both participate in their achievement and ^{acknowledge} ~~appreciate~~ their results. ^{In today's lecture I shall} ~~To the analysis~~ ^{of this structure I shall now turn.} ^{in my lecture next Monday.}

These are
before

collected material for the analysis
of this structure

Since animals cannot operate on symbols, all acts of animal intelligence are necessarily unformalised; but the knowledge which they acquire may be of a kind which we human beings can formalise. Indeed, the feats of intelligence in which animals are trained by psychologists are generally chosen in such a manner as to facilitate their precise description by the psychologist. When a dog is taught that the sound of a bell is a signal for approaching food, his knowledge can be written in the form "^{whenever} p (the bell) then presently q (the food)". This is a specifiable sign-event relation. Animals also learn to run a maze and to

take alternative shortest routes in a maze they have learned, when they find the shortest passage unexpectedly blocked. We may formalise ^{such} ~~this~~ knowledge ^{can again be formalised by drawing} by a map of the maze which shows us the alternative shortest routes through the maze, and we may regard ~~the~~ knowledge contained in the map ^{The map may be regarded as a specification} as a ~~specifiable~~ knowledge of alternative part-whole relationships. A third important type of knowledge which animals can acquire is knowledge of means-ends relations; such as pressing a lever at certain intervals to release a pellet of food, and the like. This knowledge can be formalised by defining the operative principles applied by the animals.

We may call the first and second kind of knowledge ^(non-event and alternative part-whole) theoretical, in contrast to the third ^(means-ends) which is practical.

A transition from specifiable to unspecifiable knowledge leads to connoisseurship for the theoretical and to skills or arts for the practical forms of knowledge.

Using the terms in a wider sense we may include under skills and arts all motoric performances of an unspecifiable kind and may note that some skilful motoricity enters into every kind of intelligent ^{performance} ~~experience~~. Even the most elementary ^{perceptions are} ~~empirical knowledge~~ is shaped by the trained operation of the eye, ear and touch and the more complex forms of knowledge which we class as connoisseurship must frequently rely on special tests, ~~the performance of which requires great~~ ^{the} skills of an expert.

It ^{may} seem proper therefore to start with the analysis of practical skills and to proceed then to connoisseurship, and ~~this~~ ^{also} has the ~~added~~ ^{intense} advantage that ~~one~~ ^{participation} personal element of ~~the~~ ~~mental action~~, ~~the structure of which we want to discover~~, is more massively embodied in the skilfully controlled movements of the body than it is even in the most subtle act of expert appreciation. We know how the golfer raising his club again and again in taking aim for a drive, or the athlete

concentrating every muscle of his body in the instant before a high jump, pours his whole person completely into the precise adjustment of his effort. It is shown by the way he is put off by the slightest diversion. *Connoisseurship is often carried out in a more detached manner.*

On the other hand, we cannot ~~deal with~~ practical skills without ^{*practising*} ~~introducing~~ ^{*(of course)*} ~~connoisseurship;~~ ^{*(describe)*} for if it be true that a skilful act co-ordinates an unspecifiable set of means for the achievement of its purpose, then our appreciation of such an act must be based on its unspecifiable constituents and represent, therefore, by our definition, a feat of connoisseurship. We cannot recognise skilful action ^{*only by*} ~~without~~ the exercise of skilful knowing, ^{*and art.*} ~~The criticism of art~~ is indeed the very paradigm of connoisseurship.

~~It will be best to bear in mind therefore from the start that~~ ^{*indeed*} ~~the arts of doing and of knowing are,~~ but two aspects of a single art: ^{*which might be called*} ~~the art of making sense.~~ A cook who from ~~inedible and often revolting ingredients produces a delicious meal, performs a feat of practical art; but the planning of this process requires a connoisseur's judgment of the attractiveness of particular combination of foods and of the quality and flavour of the ingredients for each dish. We may expect to find that our personal participation has the same kind of structure in both of these so closely interwoven arts.~~

^{*now*} I shall define ~~here~~ as a skill in the narrower sense a pattern of motoric behaviour carried on by conscious effort and, in its most characteristic instances, guided by strained attention towards an aim well known to the performer, though he may not be able to designate it clearly in words. A swimmer obviously aims at remaining afloat and a rider at remaining in the saddle, but the aims of a champion ^{*diver?*} plunger or

a skilful horseman can be referred to only in the delicate terms of connoisseurship. The appreciation of the grace, poise, elegance, etc. aimed at in these arts itself forms part of these arts. This becomes quite obvious if we pass from athletic skills to the practice of dancing or of musical virtuosity.

It has been frequently observed that the aim of a skilful performance is achieved by the observance of a set of rules which are not known as such to persons ^{following} ~~observing~~ them. The decisive factor by which the swimmer keeps himself afloat is the manner he regulates his respiration. He keeps his buoyancy at an increased level by refraining from emptying his lungs when breathing out and inflating them more than usual when breathing in. Yet this is not generally known to swimmers: a well known scientist who in his youth had to support himself by swimming lessons told me how puzzled he was when he tried to discover what made him swim; whatever he tried to do in the water, he always kept afloat. ^{From} ~~From~~ my interrogations of physicists, engineers and bicycle manufacturers I have come to the conclusion that the principle by which the cyclist keeps his balance is largely unknown. It was presumably first put into operation incidentally with the invention of the bicycle when somebody first learnt to use it. The rule observed by the cyclist is this. When he starts falling to the right he turns the handlebar to the right, so that - owing to the friction between front tyre and ground - which opposes a sliding of the tyre sideways but allows it to roll forward in its own plane - the motion of the bicycle is deflected towards the right. This results in a centrifugal force which pushes the cyclist to the left and offsets the gravitational force dragging him down to the right. This manoeuvre presently throw the cyclist out of balance to the left,

which he counteracts by turning the handlebar to the left; and so he continues to keep himself in balance by winding along a series of appropriate curvatures. A more detailed analysis would show that the curvature of each winding is for a given measure of unbalance inversely proportional to the square root of the speed at which the cyclist is proceeding.

It is widely ^{and rightly} recognised that no strict rules can ever even approximately define the performance of an art. You obviously cannot adjust the curvature of your bicycle's path proportionately to the quotient of your unbalance over the square root of your speed; and if you could you would fall off the machine, for there are a number of other factors to be taken into account in practice which are left out in the formulation of this rule. Rules of art can be useful, but they do not determine the practice of an art; they are maxims, which can serve as a guide to an art only if they can be integrated into the practical knowledge of the art. They cannot replace this knowledge.

Hence there is a danger that the analytical reconsideration of a practical performance may be misleading. A reconsideration based on an incomplete analysis which it assumes to be complete, might deny the existence of the analytically unaccountable qualities of the original performance and might indeed entirely discredit the performance. The extensive controversy on the 'touch' of pianists may serve as an example. Musicians regard it as a glaringly obvious fact that the sounding of a note on the piano can be done in different ways, depending on the 'touch' of the pianist. To acquire the right touch is the endeavour of every learner, and the mature artist counts its possessions among his chief accomplishments. A pianist's touch is prized

alike by the public and by his pupils: it has a great value in money. Yet when the process of sounding a note on the piano is analysed, it appears difficult to account for the existence of 'touch'. When a key is depressed a hammer is set in motion which hits a string. The hammer is pushed by the depressed key only for a short distance and is thereby flung into free motion which is eventually stopped by the chord. Therefore, it is argued, the effect of the hammer on the chord is fully determined by the speed of the hammer in free motion at the moment when it hits the ~~latter~~^{chord}. As this speed varies, the note of the chord will sound more or less loudly, which may be accompanied by changes in colour, etc., owing to concurrent changes in the composition of overtones, but it should make no difference in what manner the hammer acquired any particular speed. Accordingly, there could be no difference as between tyro and virtuoso in the tone of the notes which they strike on a given piano; one of the most valued qualities of the pianist's performance would be utterly discredited.^x Such has indeed been the tendency of the analysis of the pianist's 'touch' until eventually it was discovered to be incomplete. J. Baron and J. Hollo called attention to the noise that the depression of a key makes when all chords are removed from a piano. This noise can be varied while the speed imparted to the hammer remains unaltered. The noise mingles with the note sounded by the hammer on the chord and modifies its quality, and this seems to account in the main for the pianist's capacity to control the tone of the piano by the art of his touch.

This example should stand for many others which teach the same lesson; namely that to deny the feasibility of something that is alleged to have been done or the possibility

(x) Hart, Fuller and ^{LUSBY} ~~Lisby~~, Journ. Acous. Soc. Amer. Vol. 6, p. 80 (1934). (in Woods, Physics of Music, p. 96).

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of an event that is supposed to have been observed, merely because we cannot understand in terms of our hitherto accepted framework how it could have been done or could have happened, may often result in explaining away quite genuine practices or experiences. It is also clear that such fallacies will be frequent in a positivistic age striving to eliminate all unspecifiable, personal knowledge. Yet, essentially this method of criticism is sound, and without its constant control no scientist or technician could keep a steady course among the many spurious observations which he has to set aside unexplained every day. Destructive analysis remains also an indispensable weapon against superstition and specious practices. Take for example, homeopathy. In this case the efficacy of an alleged art, still widely practised today, can be wholly refuted by a mere analysis of its claims. Medicinal substances used homoeopathically can be shown, on the evidence of homoeopathic prescriptions, to be diluted to concentrations as low as, or below that, in which they are present in all ordinary food and drinking water; it seems impossible that an additional spoonful of them administered in a similar dilution could be medically effective. However, since quite genuine practical arts may be largely unspecifiable, the criticism of an art by the analysis of its operations may well be misleading and unfortunately there ~~is~~ ^{can be} no rule to instruct us ^{precisely} (how far to rely on it and where to stop with it.

The irreducible core of this uncertainty can be recognised in the history of Mesmerism and of the emergence in its place of the modern concept of hypnosis. The critics of Mesmer and later of Elliotson, the greatest of Mesmer's followers, were right in demonstrating that the manipulations which these experimenters professed to be performing were in

themselves ineffective. The evidence for the material existence of 'animal magnetism' which could be communicated to a piece of metal or a glass of water, and was transmitted from these to human beings was rightly rejected. But the critics of Mesmerism were wrong in denying on these grounds the reality of Mesmeric performances, though they could hardly do otherwise, in view of what the Mesmerists said they were doing. Elliotson had expounded an elaborate system of laws governing the transmission of animal magnetism. He claimed that the magnetism of a glass of water the drinking of which caused cataleptic trance could be graded by dipping one finger into it, or two fingers, or the whole hand. Another law declared that mucous surfaces of the subject, like those of the tongue or the eyeball, were capable of receiving a greater mesmeric stimulus than the skin. Later Elliotson announced that gold and nickel were more sensitive to mesmeric influences than baser metals like lead. All this could be and was proved to be nonsense. During a demonstration arranged by the editor of the Lancet, Thomas Wakley, the latter secretly replaced the carefully magnetised nickel disc by an unmagnetised lead disc and arranged for somebody to exclaim at the moment when the disc was handed to the subject: "Take care you don't apply the nickel too strongly!" When thereupon the subject reacted to the lead disc as if it were magnetized nickel, Wakley had shattered Elliotson's theory. Since the assumption had not yet dawned on any of the participants that suggestion could be regarded as an effective agent, the conclusion seemed inevitable that the subject was an impostor, who was either deluding Elliotson or colluding with him. In vain did Elliotson bitterly appeal: "I have given details of 76 painless operations, in the name of common sense and humanity, what more is wanted?" Once the assumption of unlimited deception was admitted - as it seemed reasonable to do on the grounds of Elliotson's dramatic failures, no conceivable

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evidence could compel conviction. Not until the concept of hypnosis was established as a framework for the facts, could these be eventually admitted to be true. Destruction of fancies and denial of ^{True} facts, continued to ^{be derived} flow in an inextricable mixture from the critical analysis of Mesmerism until Braid discovered the new mode of thought in which fact and fable fell apart.

We may say in ^{general that} (When truth and fallacy are amalgamated in a coherent system of conceptions its destructive analysis can lead to correct conclusions only when supplemented by new discoveries. But there exists no rule for making fresh discoveries or inventing truer conceptions, and hence there can be no rule, either, for avoiding the uncertainty of destructive analysis.

^{but without its obvious miscarriages} A process, similar to that of the critique of Mesmerism, has been continuously fostered during the past decades by technical research laboratories. Great industries, like the tanneries, the potteries or the steel mills; like the breweries and the whole range of textile manufacturers, as well as agriculture in its numberless branches, have realized in these days that they were carrying on their activities in the manner of an art without any/or any clear knowledge of the constitutnt detailed operations. When modern scientific research was applied to these traditional industries it was faced in the first place with the task of discovering what actually was going on there and how it was that it produced the goods. This situation was penetratingly recognized from the start as early as 1920 by W. L. Balls for the scientific study of cotton spinning. The hitherto accepted practice of spinning, Balls described as "a thing in itself, scarcely related to physical knowledge at all", so that "most of the initial decade's work on the part of the scientists will have to be spent merely in defining what the spinner knows."

Thirty years later this prediction was confirmed to me by Dr. F. C. Toy, director of Shirley Institute, the world's leading cotton research laboratory.⁺ The attempt to analyse scientifically the established industrial arts has everywhere led to similar results. Indeed even in the modern industries the undefinable know-how is still an essential part of technology. I have myself watched in Hungary a newly imported machine for blowing electric lamp bulbs, the exact counterpart of which was operating successfully in Germany, failing for a whole year to produce a single flawless bulb.

An art which cannot be specified in detail cannot be transmitted by prescription, since no prescription for it exists. It can be passed on only by example from master to apprentice. This restricts the range of diffusion to that of personal contacts, and we find accordingly that craftsmanship tends to survive in closely circumscribed local traditions. Indeed, the diffusion of crafts from one country to another can often be traced to the migration of groups of craftsmen, as that of the Huguenots driven from France by the repeal of the Edict of Nantes under Louis XIV. The greater diffusibility of articulate as compared with unspecifiable knowledge is striking. The articulate contents of science are taught all over the world in hundred of universities to which the unspecifiable art of scientific research has never penetrated. The regions of Europe in which the scientific method first originated 400 years ago are scientifically still more fruitful today, in spite of their impoverishment, than many overseas areas where much more money is available for scientific research. Without the opportunity offered to young

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scientists to serve an apprenticeship in Europe and the migration of European scientists to the new countries, their research centres could hardly have made much headway.

It follows that an art which has fallen into disuse for the period of a generation is altogether lost. There are hundreds of examples of this to which the process of mechanisation is continuously adding new ones. These losses are ^{usually} irretrievable. It is pathetic to watch the endless efforts, equipped with microscopes and chemistry, with mathematics and electronics to reproduce a single violin of the kind the half literate Stradivarius turned out as a matter of routine more than 200 years ago. A lost art is like Humpty Dumpty, all the King's horses and all the King's men cannot put it together again.

To learn by example is to submit to authority. You follow your master because you trust his manner of doing things even when you cannot analyse and account in detail for its effectiveness. By watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art, including those which are not explicitly known to the master himself. These hidden rules can be assimilated only by a person who surrenders himself (in this matter) uncritically to the imitation of another.

A society which wants to preserve a fund of personal knowledge must submit to tradition. For whatever unspecifiable knowledge is possessed by a generation today, can be received by its successors only if these will surrender their minds to the uncritical imitation of their elders.

To the extent to which our intelligence falls short of the ideal of precise formalisation, we act and see by

the light of unspecifiable knowledge and to this extent we must acknowledge that we accept the verdict of our personal appraisal, either at first hand in our own selves, or at second hand by submitting to the authority of a personal example as carrier of a tradition, in the image of which we shall try to fashion our own appraisals.

The subject of traditionalism cannot be pursued to ^{at length here;} ~~its remote ends at this stage;~~ but some peculiarities of traditional procedure are of immediate interest for the understanding of personal knowledge. They are to be found in the practice of the Common Law which is the most important system of strictly reasoned traditional activities. The common Law is founded on precedent. In deciding a case today the Courts will follow the example of other courts which have decided similar cases in the past, for in these actions they see embodied the rules of the law. This procedure recognises the principle of all traditionalism that practical wisdom is more truly embodied in action than expressed in rules of action. Accordingly, the Common Law allows for the possibility that a judge may be interpret his own action mistakenly. The judicial maxim which goes by the name of the 'doctrine of the dictum' lays it down that a precedent is constituted by the decision of a court, irrespective of its interpretation implied in any ^{obiter dicta} remarks of the judge who made the decision. The judge's action is considered more authentic than what he said he was doing.

In the course of the 17th and 18th centuries British public life developed a political art and a political doctrine. The art which embodied the exercise of public liberties was naturally unspecifiable, the doctrines of political liberty were maxims of this art which could be properly understood only by those skilled in the art. But the doctrines of political freedom spread from England

Alg. Goodhart

Precedent in English and Continental Law 50. L.Q.R. 40.
Summary in T.B. Smith The Doctrine of Judicial Precedent in Scots Law
Edinburgh 1952 p. 77 (summary of Goodhart)

in the 18th century to France and thence throughout the world, while the unspecifiable art of exercising public liberty, being communicable only by tradition, was not transmitted with it. When the French Revolutionaries acted on this doctrine, which was meaningless without a knowledge of its application in practice, Burke opposed them by a traditionalist conception of society.

Tom Paine answered ~~him~~ that the living should know best how to dispose of themselves.] With all the added knowledge acquired since the death of earlier generations and the knowledge of their present circumstances before them they should find it safer to trust their own judgment than that of their forefathers.]

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This conflict is resolved by observing that traditionalism itself is merely a rule of art which, like all such rules, becomes absurd when taken out of its practical context and accepted as a precise prescription. Traditionalism teaches us that we must submit to authority in order to learn a traditional art but its conception of art implies also that in order to master an art we must exercise our personal judgment and creative power. It would contradict itself if it claimed to prescribe the way this is to be done. Traditionalism can be consistently upheld only within a fiduciary philosophy, where there is room for it among the maxims for the proper application of which we ~~ourselves~~ assume the ultimate responsibility, *within the framework of our beliefs.*

In passing now from skills to connoisseurship we meet with forms of personal knowledge which have been surveyed extensively from a not altogether different point of view by Gestalt psychology. This makes it necessary to draw here a distinction between different categories of personal knowledge the corresponding classes of which I have not yet defined for the case of skills.

The most striking experiences in which the existence of Gestalt is revealed occur when we see a pattern or hear a tune. Patterns and tunes are ordered relations between particulars. Crystallographic theory shows that the same type of order may be represented by a great many different sets of particulars. Gestalt psychologists have stressed this for patterns and tunes, by pointing out that a pattern or tune can be transposed in an infinite variety of ways. Since the same pattern or tune can be present in different embodiments, it is to be regarded as a generic entity, comprising these embodiments as its instances. Patterns or tunes are ~~not objects but~~ classes of objects in which the same orderly relationship is exemplified. Moreover, patterns or tunes are experienced as such only if their particulars make a joint impression on our senses. If we look at each element of a pattern separately or listen to each note of a tune separately we see no pattern and hear no tune.

Whether we regard the concept of a pattern as a generic term designating an infinity of similarly ordered sets of particulars or as denoting the joint visual impression of one such set of particulars, its designation is not identifiable with any series of these particulars, taken separately. In this sense a pattern, and likewise a tune, is not specifiable in terms of its particulars. But this is not the exact analogue to the unspecifiability of skills which I have been ^(so far) describing. For we can well identify the constituent elements of ^{a particular instance of} a pattern or a tune and this could not be done for the skills I have previously mentioned. Let me set aside therefore until later the class of distinctly ordered arrays to which patterns and tunes belong and look round meanwhile for some other unspecifiable entity, exhibiting composite features the particulars of which are not identifiable. This will

introduce us to connoisseurship ^{of a kind more} ~~through an example more~~ strictly analogous to the case of practical skills. Physiognomies supply us with a broad ^{field} ~~class~~ of such ^{connoisseurship} ~~entities~~. Indeed the unspecifiable character of physiognomies is so well recognised that we may apply the name to the whole domain of composite features with unidentifiable particulars and speak of the personal knowledge which we have of such features as a knowledge of physiognomies. This knowledge which we may, for short, call physiognosis, is precisely parallel to unspecifiable skills. It is the art of knowing and as such an exact counterpart to the art of doing. Its practice is entailed even in the most rigorous and abstract disciplines; but it looms largest in the morphological sciences and in the process of recognizing men and animals on which from infancy, the development of intelligence largely rests.

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Besides studying the nature of distinctive ordered arrays (like patterns and tunes) Gestalt psychology has given serious attention also to physiognomies, unfortunately, without making clear the difference between arrays and physiognomies, the importance of which I shall make apparent later. The most obvious examples of physiognomies are the various facial expressions commonly described as furious, surprised, laughing, sneering, expectant, dejected, sulking, reproachful and many others. To this range of physiognomies reflecting the changing mood of men, add the facial variations which characterise youth and age, express different characters - brutality, firmness, timidity, etc. - and which reveal family resemblances. Remember the striking physiognomies of the insane, the heavy countenance of the melancholic, the idiot's face, the frenzied light in the maniac's eye. There have been attempts to specify such physiognomic differences in terms of the facial muscles involved in producing them. But such descriptions mobilise

in vain the heavy armoury of anatomic science to achieve what any child - even a suckling baby - can achieve at a glance, namely to recognise a smiling or an angry face. This recognition could never be replaced by an examination of some fifteen facial muscles.

A less familiar case will demonstrate this fact more convincingly. In his book on the Mentality of Apes (2nd Ed. 1927) Köhler described (on p. 289) a test which he performed on the occasion of the arrival at the experimental station of a new chimpanzee in a box. "I did not know (he writes) whether it was a male or a female, and it happened that it arrived in a small box, through the window of which one could recognise nothing but its head. The whole character of its face immediately gave me the impression that it was a female ape. One after another I now allowed five people (of whom three were wholly or almost illiterate, but who knew the whole band of apes at the Station very well) to go to the box, and each one, independently of the others, by looking at its face only, to judge the sex of the creature. All the opinions were: "female", and that was right. Even now, after many years' acquaintance with chimpanzees, I could not give a morphological, distinctive mark (in this sense of some special characteristic of head or face) by which to distinguish the two sexes in young chimpanzees".

The classification of plants and animals into different kinds and the identification of individual specimens as members of a known kind relies on the assessment of not strictly specifiable complex characteristics which may be called physiognomies in the wider sense in which I employ the term here. The taxonomist must possess an intimate personal knowledge of these typical physiognomies,

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 just at the medical diagnostician must know the complex picture of the various diseases at first hand, from experience. I shall return to this more fully in the chapter which deals with the form, growth and function of living bodies.

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 We may take meanwhile some examples of inanimate objects which are customarily characterised by their physiognomies. Meteorologists have agreed the world over to characterise cloud formations for the purpose of their reports by a system of four families comprising ten classes. A list of these is given in the Appendix). Each class of clouds has its distinctive shape and shade of brightness, is usually found at a certain level, in motion or at rest. They have different dispositions to produce rain or to affect the weather in some other manner.

These classifications rely on the identifiability of certain typical arrangements of particulars. One might go so far as to speak of the different patterns shown by each cloud formation. The surface of alto-cumulus clouds for example looks like crowded sheep backs. Such arrangements like true patterns represent generic characteristics which can be recognisably embodied in an infinite variety of different instances. But they do not entail any precise relations between their constituent elements which could be defined geometrically, and they can therefore not be classed as true patterns.

In any case the characteristic spatial arrangement of its elements is only one feature in the typical appearance of a cloud formation. You can acquire a proper knowledge of these typical appearances only from experience. Textbooks offer typical photographs of them and under expert

guidance one may learn to identify them safely in practice. The seaman or pilot who has to guess the hidden qualities of a cloud formation or the prospector in search of mineral deposits may develop to a fine art the capacity for appreciating the physiognomy of the sky or of the hills. Such connoisseurship relies on a multitude of delicate detail which cannot be fully specified.

Moreover, connoisseurship, like skill, can be communicated only by example, not by precept. To become an expert wine-taster, to acquire a knowledge of innumerable different blends of tea or to be trained as a medical diagnostician you must go through a long course of experience under the guidance of a master. Unless a doctor can recognise certain symptoms, e.g. the accentuation of the second sound of the pulmonary artery there is no use for him in reading the description of syndromes of which this symptom forms part. He must personally know that symptom and he can learn this only by repeatedly being given cases for auscultation in which the symptom is authoritatively known to be present side by side with other cases in which it is authoritatively known to be absent, until he has fully realised the difference between them and can demonstrate this knowledge practically to the satisfaction of an expert. The large amount of time spent by students of chemistry, biology and medicine in their practical courses shows how greatly ~~the teaching of~~ these sciences relies on the transmission of skills and connoisseurship, from master to apprentice. Descriptive sciences like zoology and botany are accordingly classed as non-exact sciences in contrast to physics which is regarded as an exact science. While skill and connoisseurship play a marginal part also in the exact sciences, particularly as

guides to the pursuit of research, zoology, botany, as well as technology and medicine contain such unspecifiable knowledge in the ~~very~~^{main} body of their discipline *science*.

Wherever connoisseurship is found operating within science or technology we may assume that it persists only because it has not been possible to replace it by a measurable grading. For a measurement has the advantage of greater objectivity, as shown by the fact that measurements give consistent results in the hands of different observers all over the world, which is rarely achieved in the case of physiognomic appreciations. ~~For example,~~ ^G great efforts have been made ^{for example} in recent years by physicists to rival and eclipse the traditional connoisseurship of raw cotton as practised by professional cotton classers, ~~This may serve here as an illustration for the substantial functions performed by such personal tests, which in this case~~ ^{but these} have so far proved irreplaceable.

There are thousands of varieties of cotton which can be discriminated by matching them with standard samples.

The testing of cotton is carried out by a process called 'pulling'. You take a tuft of cotton, smooth it out and then, holding either end of the tuft between thumb and forefinger of either hand, you estimate first the length of the fibres by inspection and then their strength by tearing them. You have to rely on the feel of your fingers while developing great muscular strength in pulling the tuft. ↑ Mr. Hulme, who is Director of the Fine Spinners' Association, the largest spinning concern in the world, told me that it took him 10 years practice in matching to establish himself as an expert by the standards already established, after that he went on to develop new standards set by himself, based on his experience in the mills. His

training has continuously improved during 25 years. Mr. Hulme's knuckles are covered with thick callouses, from practising this test for many years. He is the only person qualified for classing cotton in the firm which buys 5-6£. million worth of cotton per year. He cannot delegate any significant part of his responsibility. Eventually another man will replace him in his unique function, trained in many years of apprenticeship to take over his art.

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from p. 21
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For more than thirty years the Textile Research Institutions of the world have been trying to replace the empirical classing of cotton by ^{laboratory} ~~quantitative~~ tests based on the measurement of significant variables. Mr. E. Lord of the British Cotton Industry Research Association sums up this programme as follows:

"In everyday practice appreciation of the value of raw cotton is based upon a combined impression of several characters observed almost unconsciously by hand and by eye as a result of long experience. It is often difficult to say exactly what is observed; even more difficult is it to express such observations on a definite scale which everyone can immediately understand. The function of laboratory tests is to obtain separate measures of the different characters, to express these results in numbers, a language which everyone can understand."⁺

The fact that the Fine Spinners' Association still pays a Director to "pull" cotton, shows that this success has not yet been achieved. There are certain interesting magnitudes which can be characterised by objective methods, and where such methods have been devised a laboratory assistant can carry out the test after a few hours' training.

These also have the advantage of greater consistency and universality than personal tests. But they do not offer an adequate basis for judging a sample in respect to the practical requirements of the trade.

Mr Hulme told me of
~~One of the reasons for this lies in~~ the great

variety of different colours to be distinguished in raw cotton. A creamy and a snow white cotton may be poles apart in value. In addition to this the buyer has to grade the lustre and brightness of cotton which is called its bloom as against the dullness of other varieties, which makes them suitable for other purposes. A wide range of such qualities enters into the physiognomy which ultimately determines the valuation of a shipment of cotton and the particular use to which it will be assigned.

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p. 20*

I have described the grading of raw cotton as one example. But there are countless others. All the cloth in the world continues to be bought on the basis of manual tests of the connoisseur. He crumples up a sample of cloth in his palm to assess a quality he calls its "handle". Hundreds of different goods are internationally classed on a similar basis, as for example, South African wool and hides. There are about 300 classes of each which are identified by the exporters in South Africa and accepted as true to type by buyers in Britain perhaps 6 or 8 months later.

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A physiognomy is a pattern which, being composed of unspecifiable particulars, cannot be formally defined. The appreciation of such an informal pattern is a matter of judgment, ~~and a capacity for exercising such judgment is the principal function of connoisseurship.~~ When a person is acknowledged as a connoisseur (or an expert) his judgment

is recognised as authoritative, ^{which} ~~This~~ implies the affirmation that a number of other people ^{rely on} ~~similarly trust~~ his judgment and that it deserves to be universally so trusted.

The judgment exercised here consists in the appreciation of a complex relationship between unspecifiable elements. As its result the expert sees a rich panorama of distinctive physiognomies where the layman's eye sees nothing that is significant. But when the eye, the ear or the touch are trained to such feats of intelligent discrimination their native sensibilities are enhanced as well. The eyesight of persons born blind and later made to see, grows sharper with a growing understanding of the things seen. Training for connoisseurship sharpens the senses and refines taste. This development of taste makes the connoisseur into a different kind of person, by changing his likes and dislikes. The connoisseur is trained to discriminate physiognomies by the guidance of an improved taste.

There are thus two kinds of judgment combined here: namely that of an intelligent personal act and that of a subjective response. To recognise connoisseurship is to grant authority to a person both in respect to his understanding and his taste.

At the most primitive level the cultivation of tastes represents the education of sensuality. Weaning from our mother's breast and being taught to enjoy the bottle instead, is our first experience of such education. Maturation develops various new dispositions in us, which can be profoundly modified by educational influences. This is notoriously true of appetite for food and of the sexual instinct. Distaste for human flesh and for incestuous intercourse is acquired by education. The sexual desires of hermaphrodites are found to correspond to the sex they

have been brought up to believe they belong to rather than to the sex of their gonads. Practices like smoking may be repulsive at first, and yet gain powerful attraction for us. I shall have more to say at a later stage of such transformations of sensual values. At the moment I only want to mention their existence and to point out that they are continuous with the whole realm of cultured sensibilities by which we come to appreciate ^{all} intellectual and artistic ^{excellence} values. In this wider sense connoisseurship in taste consists in the capacity for indicating what is truly enjoyable, a capacity which is ^{imputed to} ~~inherent in~~ persons having the tastes in question. There is no possibility whatever of replacing their judgment by measured parameters, for this kind of personal appraisal involves its ~~own~~ ratification in the light of its own personal standards.