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SCIENTIFIC COMMUNICATION - CREDIBILITY AND RESPONSIBILITY

Hon Justice M D Kirby

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ABSTRACT

This paper deals with the means of promoting better communication between expert scientific opinion and legal decision-makers. It starts by describing the source of the problem : the lay mind which must in a limited time absorb and evaluate specialist, scientific information. It contrasts the scientist's search for absolute or objective "truth" with the contest inherent in a trial setting. The rules of evidence are important for the information that gets before the tribunal. The relevancy rule is accepted. The rule against hearsay evidence is questioned and reforms to permit "reliable" hearsay are described. The rule requiring that scientific and technical evidence should be given only by qualified experts is described. It works well until such evidence conflicts with other expert opinion or with intuition and common sense. What happens then, is described by reference to cases.

Reform to promote better communication is outlined. At the stage of drawing laws, the use of law reform commissions to evaluate scientific evidence is advocated. So far as the composition of the decision-making tribunal is concerned, three possible improvements are mentioned. These include the use of scientific assessors, constitution of specialist tribunals and reference to special referees.

The paper concludes with a description of reform in the trial setting by which science and technology are to be used to bring "real evidence" before decision-makers.

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> The law has principles, but no grand theory. Its principles are moral political, admonitory. They are also commentaries on, guides to, organizers of, its detail. But the general principles by themselves are rarely reliable for deduction, and they clearly never could be. Lawyers do not dream that a few parsimonious, overreaching laws may one day subsume all others. They know the difference between Locke's subject - matter and Newton's. They neither suppose their science to be young, nor sit industriously under apple trees.
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> *Hugh Stretton, The Political Sciences*, 1969, p.220.

THE PROBLEM OF COMMUNICATION

When social conflict occurs in our society we expect the law and its practitioners to assist in the solution. Laws are written, administered, interpreted, enforced by the machinery of government. Every day in our courts conflicting scientific evidence is given and different scientific opinions are stated. These conflicts and differences must, almost without exception, be resolved by laymen. If a dispute cannot be settled by the advice of lawyers and other advisers cognisant of differing scientific opinion, it falls to a tribunal made up of a judge sitting alone or with a jury to evaluate and finally determine the issue in dispute. We do this basically by a trial process : pitting competing adversaries against each other. The aim of this battle is not necessarily the discovery

of objective "truth" or even the best opinion and latest wisdom. On the contrary, in many criminal cases, the accused, if guilty, may actively resist the search for objective truth. If he is guilty, it is plainly imperative that he should try to conceal it.[1] In a civil case, the role of the tribunal is to determine which of the competing cases is the more credible.[2] The tribunal does not, in our system, normally investigate. It sits as an impartial and generally passive umpire, to hear competing contentions and then resolve them, as best it can, on the material placed before it, helped along by practical common sense.

Needless to say, this system has its critics. There is not a lawyer alive who has not been regaled about the defects of this method of resolving disputes. The system of trial by jury, still integral to the machinery of criminal justice, grew, like so many other British institutions, out of an entirely different creature. The earlier modes of trial : by ordeal, by battle or by wager of law, were means of preserving the peace in society by terminating disputes in a ritualistic procedure. Unless it was by divine intervention, there was no necessity that the party whose cause was just and right would succeed. Trial by jury began when jurors were drawn from the neighbourhood and required to resolve disputes relying on their own knowledge, however obtained, of the facts of the case and the parties before them. In these circumstances, witnesses were rarely called because the jurors themselves were the witnesses. Out of this machinery for informed decision-making, by a process of slow steps, the present disinterested fact-finding trial developed.[3] No longer may the tribunal rely upon its own knowledge of the facts. Indeed relevant knowledge of the facts must disqualify a person from participating in the process of evaluation. In a court room, unlike a coroner conducting an inquest or a Royal Commissioner pursuing his investigations, the tribunal of fact

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1. R. le G. Brereton, "Evidence in Medicine, Science and the Law" (1968) 1 *Aust.Jo.Forensic Sciences* 9 at p.15.
2. *Loc cit.*
3. *Ibid* p.17

merely evaluates the evidence which the interested parties elect or are able to place before it. The concept of an independent umpire, merely hearing disputing contentions and awarding the prize to the best, is one that offends some scientists especially in the physical sciences, who assert that it should be the function of the law and of its machinery to search for abstract or objective truth. Upon this view, the English, who after all invented most of the games of sport that are now popular throughout the world, are taking their passion for a "sporting contest" too far. Determining people's rights, including their liberties, is, according to this view, too important to be committed to a mere game.

It is true that the consequences of the present method of resolving disputes in a court setting are in some ways unsatisfactory and often puzzling to the scientist. Because the conflict is to be resolved by frail lay minds (be they of judge or jurors) the course taken by a trial may have more to do with the likely effect of a line of questions in the trial setting than the adequate testing of a scientific hypothesis. In the High Court of Australia, Windeyer J. put it this way :

> "Answering a cross-examiner is not ... a satisfactory method for the complete exposition of theories of cyto-pathology. And the purpose of the cross examination here was not really to enable [the doctor] to explain his doctrine, but rather to discredit it in the eyes of the jury by getting him, without allowing any opportunity for qualification or elaboration, to give categorical answers that it was hoped would appear so extravagant that his evidence might be scoffed at" [4]

Many writers complain about the "degrading" aspects of the adversary trial process.[5] The more difficult question is how that process copes with the admission of the scientific evidence, particularly where it is in conflict.

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4. *Commissioner for Government Transport v. Adamcik* (1961) 106 *C.L.R.* 292 at p.305.
5. Z. Bankowski and G. Mungham, *Images of Law*, 1976, p.8.

Rules of evidence and procedure have been developed with a view to assisting tribunals in the evaluation of evidence "for the purpose of excluding considerations and arguments which can have no rational bearing, or which substitute prejudice for reason".[6] The aim is to focus the attention of the tribunal upon the true issue for trial and to make sure that all evidence tendered which is relevant and addressed to the problem before the court, is received to assist in the resolution of the dispute. It is not possible in a court room, as it would be in a laboratory, to allow, over objection, every statement or other piece of evidence that a witness wanted to give. The first restriction is the requirement that the testimony be relevant and material. The second is that only first hand evidence and not hearsay evidence may be given. The third relevant restriction limits the giving of evidence of scientific or technical facts or theories to those who are specially qualified to do so.[7]

Nobody could much complain about a rule of evidence requiring relevancy. Views of what is relevant or not will differ. But Sir Owen Dixon was surely right when he said that "in every controversy there appears to be a fatal tendency to shift and extend the battle ground; and I have not noticed that learned or scientific disputations are remarkable for steady adherence to the point at issue".[8]

The hearsay rule of evidence, on the other hand, has come in for much criticism.[9] According to some, the rule is essential to our oral system of trial. Second-hand statements, when put to the court, originate from the perceptions of persons not under oath, not subject to cross examination and not confronting the party injured by the statement. The maker of a

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6. Sir Owen Dixon, "Science and Judicial Proceedings" in *Jesting Pilate*, Ed. Judge Woinarski, p.11, at p.16.
7. Dixon, p.17.
8. Dixon, p.17.
9. Law Reform Commission (N.S.W.), Working Paper on *The Rule Against Hearsay*, 1976, p.17.

hearsay statement may have deliberately lied or may have defectiv observation,memory and expression. These weaknesses cannot be noticed nor his demeanour observed in the trial process. The rule is therefore of considerable importance to the way in which we have come to the ultimate resolution of disputes in our society. Few reform proposals suggest total abolition of the rule. Modification is, however, being proposed so that courts will have a general discretion to admit "reliable" hearsay material, where at the moment it would have to be excluded or proved separately.[10]

From the earliest days, the courts have been ready to act upon the opinion of experts. In 1553 Saunders J. in *Buckley v. Rice-Thomas*[11] put it in this rather self satisfied way :

> "If matters arise in our law which concern other sciences or faculties we commonly apply for the aid of that science or faculty which it concerns. This is a commendable thing in our law. For thereby it appears that we do not dismiss all other sciences but our own, but we approve of them and encourage them as things worthy of commend-ation".

So long as the expert was a member of the jury itself, there was no opportunity for objection to his evidence nor any chance that his opinion would be excluded. As the impartial jury developed, containing citizens chosen for their ignorance of the issue for trial, the need to admit expert scientific and like information as evidence increased. This led to the development of many rules designed to guide courts in the fair admission of scientific opinion. Fundamental is the rule that it is not for the expert to usurp the decision by the tribunal of fact. His duty is stated by Lord President Cooper in *Davie v. Edinburgh Magistrates*[12] :

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10. *Ibid*, p.18.
11. (1554), 1 *Plowd.* 118 at p.124.
12. [1953] *S.C.* 34 at p.40. See R. Cross, *Evidence* (Aust.Ed) 1970, p.462.

> "To furnish the judge or jury with the necessary scientific criteria for testing the accuracy of their conclusions, so as to enable the judge or jury to form their own independent judgment by the application of these criteria to the facts proved in evidence".

The rules governing the reception of expert evidence are not without problems. Most acute are the problems that arise for the law when there is a conflict of expert testimony or where expert opinion must be weighed against other evidence or circumstances in the case.

Take the case of conflicting testimony. In *Commissioner for Government Transport v. Adamcik*[13] a widow claimed damages in respect of the death of her husband who, whilst a conductor on a tram, was knocked from the footboard. He was admitted to hospital suffering from a fracture, bruises, lacerations and abrasions. Three days after he left hospital symptoms of leukaemia appeared. Three weeks later he was readmitted to hospital and he died as a result of this condition about six months afterwards. The widow claimed that the death of the deceased resulted from injuries sustained in the accident. Medical witnesses were called for the defendant. They were of the opinion that any causal relationship between the injuries and the onset of the disease was most unlikely, although they could not swear that it was impossible. One medical practitioner called on behalf of the widow expressed an opinion that the injuries, together with mental stress accompanying them, had caused the leukaemia. The jury found a verdict for the plaintiff. The Supreme Court dismissed the appeals, as did the High Court of Australia. The judges were faced in this case, as in so many others which daily confront the courts, with conflicting medical opinions. Menzies J. put the problem for the law in this way :

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13. Fn. 4

> "From his cross-examination it appeared that although [the doctor] had treated about 20 cases of leukaemia, he had only treated one case of acute lymphatic leukaemia; but this is a matter that went to the weight of his evidence rather than to its admissibility. It would be going too far to say that any legally qualified medical practitioner is to be regarded as sufficiently qualified as an expert to express an opinion about any matter of medical science, but in this case it is not necessary to go anything like that far. This is a case of a practising specialist physician with high qualifications and a hospital appointment expressing his opinion about the cause of a well-known disease, a subject upon which, despite investigation, there is as yet no positive knowledge ... It is only because his opinion was one that medical science seeminly does not accept as reliable that it is contended he lacked the qualifications necessary for expressing it; but the giving of correct expert evidence cannot be treated as a qualification necessary for giving expert evidence". 14

Windeyer J. followed the passage already cited with the following observations :

> "He did make assertions that to many people must appear in a high degree improbable. And the physicians called for the defendants did not accept his theory. But however far-fetched some of statements may seem, however much his theory may be criticised as unproven, however much it is out of line with orthodox opinion, it would be a bold court that could say that he was not qualified to express an opinion on medical matters and that the jury should have been told that, as a matter of law, they must disregard his opinion. The learned trial judge did in effect advise them to treat it with scepticism ... The case is not one in which a witness, posing as an expert, made assertions that are contrary to proved scientific facts or to the known phenomena of nature, thus exposing his ignorance of the learning he professed. To liken the doctor's statements, as counsel did,

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14. *Ibid*, pp.302-3.

> to the assertion of an eccentric person that the earth is flat is, even for argumentative purposes, mistaken. If there were any value at all in such a comparison - and there really is not - [the doctor] would, no doubt, answer that he should be likened rather to those who first denied that the earth was flat. In the same way it is a mistake to liken his evidence to mere superstitions by which curative properties are attributed to things that have been scientifically proved to have no such properties. The most that could be urged against [his] evidence is that the cause of leukaemia is not, in a positive sense, known and that his view is thus unproven and not accepted by others; not that it can be scientifically established as false. ... His general competence as a physician was not contested. The jury could consider whether his opinion was honestly held. It was for them to consider whether, as counsel suggests, he was a charlatan. They might think so or they might regard him as an earnest but misguided proponent of an incorrect theory or as a discoverer and prophet or in some other way. ... It is not enought that we may think the jury's verdict was wrong." 15

Nor is it necessary that a court should follow the then current expert view, if there are other circumstances, such as the sequence of events that, in its opinion, outweigh expert testimony. *Adelaide Stevedoring Co. Ltd. v. Forst.*[16] A waterside worker performed two tasks requiring exertion, collapsed and shortly afterwards died. His claim for workers' compensation was disallowed by the arbitrator after hearing medical evidence which disclosed a conflict of opinion. He found that the worker's death was due to coronary thrombosis and that this condition could not generally be related to exertion. On appeal, the Supreme Court decided that although the expert testimony was not conclusive it showed that physical exertion was a possible exciting cause of thrombosis and that having regard to the probabilities, the proper conclusion was that the workman'

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15. *Ibid*, pp.305, 306, 308, 309
16. *Adelaide Steamship Co. Ltd. v. Forst* (1940) 64 *C.L.R.* 514.

exertion was in fact the cause of his death in this case. The High Court of Australia upheld this decision and ordered compensation. Rich A.C.J. put it this way :

> "I am greatly impressed by the sequence of events ... [W]hy should not a court say that here is a strong ground for a preliminary presumption of fact in favour of the view that the work materially contributed to the cause of death? From this standpoint the investigation of physiological and pathological opinion shows no more than the current medical views find insufficient reasons for connecting coronary thrombosis with effort. Be it so. That to my mind is not enought to overturn or rebut the presumption which flows from the observed sequence of events. If medical knowledge develops strong positive reasons for saying that the lay common-sense presumption is wrong, the courts, no doubt, would gladly give effect to this affirmative information. But, while science presents us with no more than a blank negation, we can only await its positive results and in the meantime act on our own intuitive inferences. The conclusion of the [arbitrator] may prove to be in advance of its time, but, as matters stand, I prefer that of the Full Court."[17]

In the end, then, under our system scientific and expert opinion must compete with intuition, so-called "common sense" and minority, even unorthodox points of view. The resolution of the conflict is not left to the experts themselves. It is passed over to laymen, who must do their best with the informatio that is supplied. To complain that this is an imperfect system, is pointless. All human justice is imperfect because man is fallible. It is said that Churchill once observed that democracy was the worst possible system of government, except all others so far proposed. Turning expert questions over entirely to the "experts" would merely remove science still more from relevance to the lay world. When we criticise the present way of doing things, we must consider whether a jury of his "peer group" would have accepted the testimony of Galileo.

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17. *Ibid* at pp.563-4. *Cf. E.M.I. v. Bes* [1970] 2 *N.S.W.R.* 238; 44 *A.L.J.* 436n.

REFORM

Having said this, there are nonetheless reforms that can be considered to diminish the tension between scientific information and the operation of the law.

Taking, first, the drawing of laws. One of the first projects before the Australian Law Reform Commission related to the drawing of new laws for the control of drinking and other drug-affected drivers. The laws based on the Commission's report have now been adopted in the Australian Capital Territory. They represent, in many respects, the acceptance of technology into the law. The reference required :

> "An examination of scientific instruments that have been devised for the specific purpose of putting at rest many old court room controversies. New questions are raised concerning the proper faith that may be put by the law in machines, given that the consequences may visit criminal penalties upon the accused. These questions point the way for other likely advances in the years to come. It is therefore important that at the outset we should get right our approach to these novel legal developments".[18]

Just as courts are frequently confronted with conflicting scientific opinions, so was the Commission. In accordance with our practice a number of consultants were appointed from numerous disciplines. They and oral and written testimony helped us to face up to a number of controversies. First among these was the reliability and relevancy of the Breathalyzer, an instrument developed to demonstrate alochol concentration from a sample of breath. Opponents of this instrument, including a professor of analytical chemistry,who was a consultant to the Commission, pointed to the many potential sources of error in its precision and accuracy.[19] Some were technical errors inherent in a machine. Others were errors arising from operator use or lack of maintenance. Competing, indeed conflicting, opinions about the reliability of the instrument can be tested

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18. The Law Reform Commission (Aust) *Alcohol, Drugs & Driving*, 1976 (ALRC4) p.1.
19. *Ibid*, p.52

by questioning and submitted to independent research. In the end, all that the decision-maker can do is to scrutinise the material placed before him and reach the best conclusion possible in the circumstances. As it happened, the Law Reform Commission accepted the Breathalyzer as the primary procedure for determining relevant blood alcohol concentration. The instrument was found to be, for the relevant purposes, "reasonabl accurate" as a means of providing a reliable measure of the level of blood alcohol concentration in the human body.[20] This decision will doubtless leave some of our consultants, several scientists and some members of the public quite dissatisfied. Time and further scientific research and opinion may prove our decision to be unwarranted. At least in the preparation of this law, a positive effort was taken to secure conflicting scientific opinions, to engage them in public and private debate, to explore their limits and to pit them one against the other. Only at the end of this process was the law adopted. One suspects that this course is not always taken. Law reform bodies can provide governments with the means of evaluation scientific developments and ensuring that they are promptly accommodated within the legal system.

Is this enough? Given the possibility that fallible lay tribunals might misunderstand, misinterpret or even reject objective scientific truths, should the legal system move away from bringing the resolution of scientific issues to the level of the ordinary man and instead commit them in some way to the specialists?

In his speech on *Science and Judicial Proceedings* Sir Owen Dixon reflects upon the desirability of changes or reforms in procedures for taking scientific evidence. He lists three. The first is the use of *scientific assessors*.[21] It sounds an

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20. *Ibid*, p.125.
21. Dixon, p.19

attractive idea and has been tried in some areas of the law. In Admiralty cases in England, for example, it is not uncommon to have two brethren of Trinity House to sit with the primary judge in an Admiralty suit.[22] The notion of involving experts in the deliberations, but not the decision of a tribunal appears sensible and may be appropriate in some connections. It is, for example, being used in the Northern Territory of Australia where Aboriginals sit with magistrates in certain centres and inform them of local customs, attitudes and even, possibly, information.[23] Is this appropriate for extension into other areas where specialist, scientific information is brought before a court? Would it diminish the need to prove uncontested facts and ensure that a background of unproved knowledge was brought to the attention of the decision-maker?

Sir Owen Dixon enumerates several problems for reform of this kind. The range of scientific subjects which come before courts is limitless. A comprehensive scheme for the use of assessors would require the enrolment of a very great number of persons. There are further practical problems. One arises from the system of courts of appeal. In the Admiralty cases, mentioned, different assessors are summoned at each level of appeal after the trial. This may introduce an element of variability and chance. The parties will normally not know the content of the assessors' advice to the tribunal. Furthermore, often scientific evidence is an important but small part of a dispute. It may, for example, be limited to one issue only in the trial. Medical evidence on the extent of a person's injuries is a case in point. Would the expense and inconvenience of such a system be warranted by the utility of extra information which could not be secured by appropriate questions? Is it just that the fate of a case may be determined not by evidence that

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22. *Loc cit.*
23. The Law Reform Commission (Aust) *Report on a Visit to the Northern Territory of Australia : Reference on Aboriginal Customary Laws*, 1977, *mimeo* p.23

can be tested and answered but by comments, however expert and well informed, behind closed doors and quite unknown to the parties? In short, the idea seems a good one but it does have problems. The Law Reform Commission in its first report on *Complaints Against Police*[24] proposed the creation of a tribunal to hear certain complaints against police and the appointment of a member of the police force as an assessor to assist the tribunal in connection with proceedings before it "by furnishing advice to the tribunal with respect to the penalty that it would be appropriate to impose on a police officer in the proceedings."[25] Although assessors have been little used in Australia and although the problems outlined by Dixon are considerable, I believe that we will see more use of assessors in the future as the mode of conducting trials becomes more informal and less leisurely.

The second solution mentioned by Dixon to promote better communication between expert scientific opinion and legal decision-makers is the creation of *specialist tribunals* with appropriate personnel and procedures to finally decide questions of a special nature arising routinely in the course of judicial proceedings.[26] The example cited is the Medical Board of the Workers' Compensation Commission. In *Smith v. Mann*[27] the question arose as to whether the Medical Board was confined to deciding the medical "condition" of a worker, leaving it to the legal tribunal (the Workers' Compensation Commission) to decide whether the condition should be attributed to the worker's employment. As the case demonstrates and as Dixon points out, it is extremely difficult to isolate and define precise issues to be submitted to a separate tribunal. Rich J. in the High Court, put it this way :

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24. The Law Reform Commission (Aust) *Complaints Against Police*, 1975, ALRC1, pp.42, 45. Reference is made to the power of Courts of Marine Inquiry under the *Navigation Act* 1912 (Cth) to add assessors, *ibid*, para 157.
25. *Ibid*, p.103 (clause 4.22(2)(c)). *Cf. Australia Police Bill, 1975*, clause 68(2)(c).
26. Dixon, p.20
27. *Smith v. Mann* (1932) 47 *C.L.R.*426, cited Dixon p.21.

> "The object of the section was to leave the condition or bodily state, physically and pathologically, of the worker to a medical authority and to withdraw it from the lay tribunal. "Condition" is a wide word ... [T]he worker's condition includes "lead poisoning" and the Commission was not at liberty to find that his incapacity arose, or might have arisen, from other causes". 28

Whilst this case and others illustrate the dangers and embarrassments that can occur when there is a distribution of authority to decide issues upon which a single result is needed, there may be cases where specialist tribunals are entirely appropriate because of the discrete issue raised and the need for interdisciplinary expertise amongst the decision-makers. Take the vexed question of whether it should be possible for minors to consent to the donation of non-regenerative organs and tissues, for example, to another member of the family. In the Law Reform Commission's recently completed project on *Human Tissue Transplants* one of the possibilities canvassed was for a special ad hoc tribunal comprising a judge, and two others, one a qualified medical practitioner and the other either a social worker or a psychologist.[29] Both at a Commonwealth and State level in Australia we are seeing more specialist tribunals of this kind. The Administrative Appeals Tribunal is a prime example of a body capable of being differently constituted in order to despatch the review of the varied administrative decisions that come under its jurisdiction. With increasing judicial and quasi-judicial review, the growth of the legal profession, paralegals and legal aid, the rapid expansion of citizen watchdogs and informal tribunals, I have no doubt that the future will unfold a greater incorporation of expertise at the level of the tribunal to replace proof of expert evidence to the wholly lay tribunal. It has been suggested, for example, that the only way to cope with corporate crime is to constitute

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28. *Ibid*, p.440.
29. The Law Reform Commission (Aust) *Human Tissue Transplants*, 1977 (ALRC7), para. 112.

a jury which comprises a number of true "peers" of the accused : businessmen and accountants able to deal rapidly, sensibly and according to modern standards with the considerable bulk of material that must often be proved in such cases. Traditionalist react unfavourably to such a notion. However, a moment's reflection upon the development of the jury system, indeed of the court system generally, should convince us that the process must not ossify at its present stage of development. It is hardly likely that it will.

The third and final new means of improving communication between scientists and the judicial process mentioned by Dixon is reference of a matter in a civil case to a *special referee*.[30] This can be done in scientific matters. It is sometimes done in patent cases but it is a rare procedure for reasons that are sufficiently elaborated above. There are, of course, many ways in which the law, in a trial setting, is at last catching up to the developments of science and technology. Here again, the Law Reform Commission can play its part. The use of tape recordings to bring the "actual evidence" of the accused's confession into the forensic situation of a criminal trial has been talked about for a generation. Now at last something has been done. The *Criminal Investigation Bill 1977* has been introduced into the Commonwealth Parliament by the Commonwealth Attorney-General, Mr. Ellicott. The Bill is substantially based upon the second report of the Australian Law Reform Commission. It also introduces other means of modernising the resolution of issues in dispute.[31] The use of videotape or photographs of identificat parades are provided for, precisely to combat the wellknown phenomenon so important in any understanding of evidence, that we see and remember particular things because of our individual makeup, training, interests and the vagaries of attentiveness. We see and hear what we want to see and hear. We remember what we want to remember.

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30. Dixon, p.21
31. Clause 34 (Recording by means of sound recording apparatus); clause 40 (Identification parades). It is now being suggested that affidavits and pre-trial proceedings, evidence of overseas or absent witnesses, evidence *de bene esse* and so on could be video-taped and recorded and brought in this way, authentically, before the decision-maker for his scrutiny.

> "The mind of the individual determines the focus of attention. This mental background is a complex of built-in knowledge, attitudes, interests and even emotions and it varies from man to man". 32

One of the efforts of law reform should be to encourage the modernisation of the law by the use of technical developments that can bring real evidence before the decision-maker.

The purpose of this paper was simply to demonstrate that things are happening. Legal machinery is at least being provided systematically to incorporate the best scientific opinion in our laws. In resolving issues, the law will increasin look to science and technology to replace, so far as possible, the vagaries of human impressions and recollections. Furthermore the way of the future is undoubtedly the greater use of specialists as members of tribunals so that scientific information does not have to be communicated on an ad hoc basis, case by case, in evidence proved and tested but as part of the capital of knowledge expected of the decision-maker. These changes will undoubtedly pose problems of communication for scientist and lawyer alike. But they will also provide opportunities for closer interdisciplinary communication than has existed to date.

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32. Brereton, p.12