Introduction

We are living in what is usually described as an 'information society' and as the business community makes ever greater use of computers the courts are going to find that increasingly the disputes before them turn on evidence which has at some stage passed through or been processed by a computer. In order to keep in step with this practice it is vital that the courts are able to take account of such evidence. As the Criminal Law Revision Committee recognised, 'the increasing use of computers by the Post Office, local authorities, banks and business firms to store information will make it more difficult to prove certain matters such as cheque card frauds, unless it is possible for this to be done from computers' (CLRC 1972, para 259).

Admissibility

The law of evidence is concerned with the means of proving the facts which are in issue and this necessarily involves the adduction of evidence which is then presented to the court. The law admits evidence only if it complies with the rules governing admissibility. Computer output is only admissible in evidence where special conditions are satisfied. These conditions are set out in detail in section 69 of the Police and Criminal Evidence Act (PACE) 1984 (see further Nyssens 1993, Reed 1993 and Tapper 1993).

In general the principles of admissibility are that the evidence must be relevant to the proof of a fact in issue, to the credibility of a witness or to the reliability of other evidence, and the evidence must not be inadmissible by virtue of some particular rule of law (Keane 1994, pp 15-20; Tapper 1990, pp 51-61).

Real evidence usually takes the form of some material object (including computer output) produced for inspection in order that the court may draw an inference from its own observation as to the existence, condition or value of the object in question. Although real evidence may be extremely valuable as a means of proof, little if any weight attaches to it unless accompanied by testimony which identifies the object in question and explains its connection with, or significance in relation to, the facts in issue or relevant to the issue.

This is illustrated in the case of R v Wood (1982) 76 Cr App R 23 where the appellant was convicted of handling stolen metals. In order to prove that metal found in his possession and metal retained from the stolen consignment had the same chemical composition cross-checking was undertaken and the figures produced were subjected to a laborious mathematical process in order that the percentage of the various metals in the samples could be stated as figures. This was done by a computer operated by chemists. At the trial, detailed evidence was given as to how the computer had been programmed and used. The computer printout was not treated as hearsay but rather as real evidence, the actual proof and relevance of which depended upon the evidence of the chemists, computer programmer and other experts involved.

The difficulty in the application of this rule lies in its interaction with the hearsay rule. Evidence is hearsay where a statement in court repeats a statement made out of court in order to prove the truth of the content of the out of court statement (Sparks v R [1964] AC 964). Similarly evidence contained in a document is hearsay if the document is produced to prove that statements made in court are true (Myers v DPP [1965] AC 1001). The evidence is excluded because the crucial aspect of the evidence, the truth of the out of court statement (oral or documentary), cannot be tested by cross-examination. (1) The problem, however, occurs because some statements, although in form assertive and inadmissible if they were to originate in the minds of human beings, in fact originate in some purely mechanical function of a machine and can be used circumstantially to prove what they appear to assert.

The basis for this view was laid down in a case having little to do with computers. In the Statute of Liberty [1968] 2 All ER 195 a collision occurred between two vessels on the Thames estuary. The estuary was monitored by radar and a film of the radar traces was admitted into evidence. Simon P rejected the argument that the film was hearsay - he held that it constituted real evidence and not hearsay and he placed it on a par with direct oral testimony. Where machines have replaced human beings, it makes no sense to insist upon rules devised to cater for human beings but rather, as Simon P said 'the law is bound these days to take cognisance of the fact that mechanical means replace human effort' (at p 196).

This useful distinction was apparently overlooked in R v Pettigrew (1980) 71 Cr App R 39 where the prosecution wished to prove that some bank notes found in the possession of the accused were part of a particular consignment despatched by the Bank of England. A computer printout was used to prove this but the Court of Appeal held that such evidence was inadmissible under the statutory provision concerned (section 1 Criminal Evidence Act 1965 - now repealed). The Court took the view that the operator did not have the requisite personal knowledge of the numbers of the bank notes rejected from the machine since they were compiled completely automatically by the computer. This conclusion is quite accurate and a perfect application of the hearsay rule but it failed to consider the use of the print-out as real evidence. This confusion between hearsay and real evidence is unfortunate and it may explain why it was necessary to create special rules for computer evidence.

Criminal Proceedings

It is imperative that computer output should be readily used as evidence in criminal cases since otherwise many cases, particularly those involving dishonesty, would be immune from prosecution. At the same time one cannot be too complacent about the technology since computers are not infallible. It is widely acknowledged that 'hacking' and 'viruses' may affect information stored on a computer. These factors were obviously taken into consideration when enacting the provisions governing computer generated evidence in criminal proceedings. (2)

Section 69 of the Police and Criminal Evidence Act 1984 provides that:

"(1) In any proceedings, a statement in a document produced by a computer shall not be admissible as evidence of any fact therein unless it is shown-
(a) that there are no reasonable grounds for believing that the statement is inaccurate because of improper use of the computer and;
(b) that at all materials times the computer was operating properly or, if not, that any respect in which it was not operating properly or was out of operation was not such as to affect the production of the document or the accuracy of its contents."

In addition any rules of court made under section 69(2) must also be satisfied (at the time of writing no such rules have been made).

Real evidence and hearsay

So far the discussion has focused on exceptions to the hearsay rule. However evidence derived from a computer constitutes real or direct evidence when it is used circumstantially rather than testimonially, that is to say when the fact that it takes one form rather than another makes it relevant, rather than the truth of some assertion which it contains. (3)

Direct evidence produced by a computer is not subject to the hearsay rule. As we have already noted, in R v Wood calculations were carried out by a computer specifically for the purpose of the trial to verify whether the composition of stolen metals matched original metals. Computer output was admissible as real evidence since it did not purport to reproduce any human assertion which had been entered into it. It was held that the machine was a tool and that in the absence of any evidence that it was defective, the printout, the product of a mechanical device, fell into the category of real evidence. The court did recognise, however, that the dividing line between admissibility of computer generated evidence as real evidence or hearsay would not always be easy to draw.

The same distinction and result were reached in Castle v Cross [1985] 1 All ER 87 and in R v Spiby (1990) 91 Cr App R 186, CA an automatic telephone logging computer which logged the call details without human intervention was admitted as real evidence. The Court also held that, in the absence of evidence to the contrary, courts would presume that such a computer was in working order at the material time.

Thus as far as the common law is concerned the status of computer evidence as real or hearsay will depend, in each case, on the content of the computer record, the reason for using it in evidence and the way in which it was compiled. Cases like R v Wood and R v Spiby, however, must now be read in light of the decisions in R v Shephard [1993] 1 All ER 225, HL and R v Cochrane [1993] Crim LR 48, CA. In R v Shephard the House of Lords held that section 69 PACE 1984 imposes a duty on anyone who wishes to admit a statement in a document produced by a computer to produce evidence that will establish that it is safe to rely on the document; such a duty cannot be discharged without evidence by the application of the presumption that

the computer is working correctly expressed in the maxim omnia praesumuntur rite esse acta; and it makes no difference whether the statement is or is not hearsay. In R v Cochrane it was held that before the judge can decide whether computer printouts are admissible, whether as real evidence or as hearsay, it is necessary to call appropriate authoritative evidence to describe the function and operation of the computer. In that case the prosecution wanted to prove that certain cash withdrawals were made from a particular 'cashpoint'. The machine would only dispense money if the correct Personal Identity Number was entered. The matching was carried out by a mainframe computer and evidence of its proper functioning was thus required by the court. The prosecution did not adduce this evidence and the conviction was set aside on appeal.

As we have seen, a printout from a computer which has been used as a calculating device, or which records information automatically without human intervention, is admissible as real evidence and involves no question of hearsay. (4) On the other hand, where the printout contains information supplied to the computer by a person, it is hearsay if tendered for the truth of what is asserted, but may be admissible under either sections 23 or 24 of the Criminal Justice Act 1988. A statement can only be admitted under sections 23 or s 24 if its maker (or the original supplier) had (or may reasonably be supposed to have had) personal knowledge of the matters dealt with. Furthermore, under section 24 the 'creator' of the document must have been acting in the course of a trade or business etc. A statement in a computer printout which has satisfied the foundation requirements of sections 23 or 24 can only be admitted on satisfaction of the additional requirements contained in section 69. (5)

Section 69 is couched in negative terms making it clear that evidence which does not satisfy its requirements is inadmissible. The object of section 69 is to impose a duty on anyone who wishes to introduce a document produced by a computer to show that it is safe to rely on that document and it makes no difference whether the computer document has been produced with or without the input of information provided by the human mind and thus may or may not be hearsay (per Lord Griffiths in R v Shephard at p 228).The operation of section 69, therefore, is not limited to printouts that fall within sections 23 or 24 of the 1988 Act. (6)

Reliability

If there is a dispute as to the admissibility of a computer printout in a criminal case involving a jury, the judge should hold a voir dire. A party seeking to admit a printout under section 24 (or section 23) must establish the foundation requirements of both that section and section 69. The judge, in deciding whether the prosecution has established these requirements, should apply the criminal standard of proof. (7) Although, as we shall see, the additional requirements of section 69 can be proved by certificate, the foundation requirements of section 24 (or section 23) must be proved by evidence unless the other party makes admissions or allows the statement to be read. There is also a third common law requirement, before the judge can decide on admissibility, namely that appropriate authoritative evidence must be adduced to describe the function and operation of the computer (eg R v Cochrane).

In R v Governor of Pentonville Prison ex p Osman [1989] 3 All ER 701 it was argued

that printouts were inadmissible because the prosecution had failed to prove the proper operation of the computers required by section 69. However Lloyd J held that "where a lengthy computer output contains no internal evidence of malfunction...it may be legitimate to infer that the computer which made the record was functioning correctly" (at p 727).

In R v Shephard the House of Lords held that it will very rarely be necessary to call an expert to prove that the computer is reliable. The defendant was charged with theft from a store. A store detective gave evidence that she had examined all the till rolls for the relevant day from the tills, which were linked to a central computer, and that they contained no record of the unique product code for some goods found in the defendant's possession. She also said that there had been no trouble with the central computer. On appeal it was argued that the evidence did not satisfy section 69 since oral evidence that the computer was operating properly is not admissible unless given by a person qualified to sign the certificate under para 8(d) of Schedule 3 which provides that:

"In any proceedings where it is desired to give a statement in evidence in accordance with section 69 above, a certificate -....
(d) purporting to be signed by a person occupying a responsible position in relation to the operation of the computer,
shall be evidence of anything stated in it; and for the purposes of this paragraph it shall be sufficient for a matter to be stated to the best of the knowledge and the belief of the person stating it."

Dismissing the appeal, it was held that section 69 can be satisfied by the oral evidence of a person familiar with the operation of the computer who can give evidence of its reliability and need not be a computer expert. Lord Griffiths said that:

"Computers vary immensely in their complexity and in the operations they perform. The nature of the evidence to discharge the burden of showing that there has been no improper use of the computer and that it was operating properly will inevitably vary from case to case. I suspect that it will very rarely be necessary to call an expert and...in the vast majority of cases it will be possible to discharge the burden by calling a witness who is familiar with the operation of the computer in the sense of knowing what the computer is required to do and who can say that it is doing it properly."

This approach was adopted in Darby v DPP The Times 4 November 1994. The appellant had driven her car into an area of road subject to a 30 mph speed limit. At that point a police speed trap was being operated. A police officer was operating a device known as a GR Speedman and he concluded that the appellant had exceeded the speed limit by driving at 43 mph. It was submitted that the evidence of the reading of the GR Speedman was inadmissible if it was held to constitute a document. It was also contended that the evidence of the read-out required certification and that, whilst oral evidence of certification would be admissible, the police officer could not give such evidence as he was not an expert in the workings of the machine, only its operation.

Potts J adopted the approach of Lloyd LJ in the Shephard case and assumed that the machine was a computer and that the visual image was a document produced by a computer. He also referred to the principle enunciated in Lord Griffiths' speech above and accordingly found no problem in holding that, on the basis of the evidence of the police officer, who was a trained and experienced operator of the device, the machine was working correctly. The appeal was consequently dismissed.

Thus it seems that the provisions in section 69 are capable of being applied without undue difficulty. However, it is interesting to note that Rose LJ pointed out that if the GR Speedman had been central to this case and if it had produced a printout on which the prosecution had relied then it may well have been caught by section 10(1)(c) (8) of the Civil Evidence Act 1968 (section 118(1) of PACE 1984 provides that a 'document' within that Act has the same meaning as in Part I of the CEA 1968). This would have meant that as a document within the meaning of section 10(1)(c) it would have constituted a document requiring certification within the meaning of section 69 and the terms of para 8 of Sch 3. But it was the police officer's opinion evidence which was central to the case and that was capable of being corroborated by a technical device, the accuracy of which had been established. Thus it appears that the conditions for admissibility for computer output in a criminal case are less demanding if the evidence provided by the machine is merely corroborative.

The ambiguities and illogicality arising from the complex conditions for admissibility of computer evidence can clearly be seen in the recent case of McKeown v DPP [1995] Crim LR 69 where the Divisional Court held that if it cannot be proved that the computer was operating properly the computer evidence will be inadmissible. This flies in the face of Lloyd LJ's dictum in the Osman case since the conclusion was reached despite the fact that evidence showed that the malfunction did not affect the accuracy of the information. The case concerned an appeal by Miss McKeown against her conviction for driving after having consumed so much alcohol that she was over the legal limit contrary to s 5(i)(a) of the Road Traffic Act 1988 and Sch 2 of the Road Traffic Offenders Act 1988.

The appellant underwent a breath test using the Lion Intoximeter 3000 breath testing device. This machine has a visual display and a memory which stores a number of results. Four printouts were produced by the machine and these were certified by the officer in charge in accordance with s 69 PACE. On his statement the officer recorded the time shown on his watch as the machine was thirteen minutes out. The submission of the appellant was that the visual displays and printouts were inadmissible on the basis that since the timing device was thirteen minutes slow it could not be shown according to s 69(1)(b) 'that at all material times the computer was operating properly, or if not, that any respect in which it was not operating properly or was out of operation was not such as to affect the production of the document or the accuracy of its' contents'. On behalf of the respondent it was argued that the words 'to a material degree' should be read into the statutory provision and that the incorrect timing did not in itself render the evidence from the machine de facto inadmissible.

Dr Williams, a director of the laboratories who supplied the breath testing machine, had been called as an expert witness on behalf of the prosecution. It was held that although he was not an electronics expert his qualifications and experience entitled him to give evidence in respect of the machine. The court accepted his evidence that the working and accuracy of the breathalyser was not affected in anyway by the clock. However, despite these findings the court took the view that there was substance in the appellant's submission that on the wording of s 69(1)(b) the inaccurate timing mechanism on the machine rendered the print outs produced by it inadmissible. The appeal was allowed and conviction quashed wholly on the basis that, despite the evidence, the prosecution could not prove that the machine was working properly. The outcome, although in line with the statutory requirements of section 69(1) (b), is quite absurd since there was no question as to the reliability of the evidence.

The McKeown case also gives rise for concern in that the defence raised the smoke-screen of concentrating on the fallibility of the computer evidence rather than the reliability of such evidence. This point was raised by Dr Castell when he delivered The VERDICT Report to the Treasury in 1987. (9) He was perturbed that the current law could be effectively exploited by defence counsel to undermine a prosecution. The Law Commission in its Consultation Paper (Law Com CP No 138) claim that there is support for this contention in that judges commented on the lengthy cross-examination of prosecutions' computer experts. It will be recalled that the standard of proof in a criminal case for evidence tendered by the prosecution is 'beyond all reasonable doubt'. The intricacy and complexity of many modern computer systems may make it relatively easy to establish a reasonable doubt in the juror's mind as to proper functioning of the computer. Using the example of the McKeown case it appears that in the absence of a presumption that the computer is working means that it may be quite easy to raise such a smoke screen. It would seem perfectly feasible that where there are doubts as to the reliability of computer generated evidence these doubts should not go to the issue of admissibility but rather to the weight of the evidence.

As we have seen in Shephard s 69 only applies where computer generated documents are tendered in evidence and there is an affirmative duty on those introducing computer evidence to show that at all times it is safe to rely on it. Thus when applying a literal interpretation of the statutory provision illogicality and confusion reigns as demonstrated by the McKeown case. Furthermore it has been held that s 69 does not apply where a witness uses computer generated evidence to refresh his or memory nor where it is used by an expert to reach a conclusion. In Sophocleous v Ringer [1988] RTR 52, another driving with excess alcohol case, evidence was given against the accused by an analyst who had used a computer which produced a graph illustrating the levels of alcohol in the blood stream. The graph was not put in evidence but the analyst was allowed to look at it to refresh her memory. As the graph had not been put in evidence the court held that s 69 did not apply.

The same outcome is illustrated in a recent Court of Appeal case, R v Golizadeh [1995] Crim LR 232. In this case a brown substance was found in the possession of the appellant which turned out to be a Class A drug (opium). The susbstance was analysed through a machine which produces a print out in the form of a pattern; this pattern is then interpreted by an expert to determine the chemical constituents of the substance. In arriving at his conclusion that the substance was indeed opium the expert witness relied on his own interpretation of the print out and the opinion of another expert called to give evidence.

One ground of appeal was that under s 69 PACE the evidence should have been excluded on the basis that it was based on the computer print outs and was therefore inadmissible. The Court of Appeal rejected this argument and held that s 69 did not apply. Morland J reiterated Lord Griffith's speech in the Shephard case whereby he stated that the object of s 69 "requires anyone who wishes to introduce computer evidence to produce evidence that will establish that it is safe to rely on the documents produced by the computer". Thus it is clearly the case that s 69 will only apply where computer print outs are actually put in evidence. Since in the present case the print outs had merely been used by the experts in reaching their findings as to the chemical constituents of the substance s 69 had no application on the facts of the case. In the words of the Law Commission in its recent Consultation Paper "if it is safe to admit evidence which relies on and incorporates the output from the computer, it is hard to see why that output should not itself be admissible" (Law Com CP No 138, para 14.13).

The irony of the situation is that it appears perfectly acceptable for evidence to be adduced which is based on computer generated print outs but at the same time if the computer evidence itself was to be presented to the court then the hurdle of complying with s 69 would have to be surmounted.

Are the special provisions necessary?

As we have seen, the statutory provisions impose special conditions on the admissibility of computer output. Are these justified? What is it that is special about computer-generated documents and that distinguishes them from their paper equivalents? It is obvious from examination of the admissibility requirements that computer evidence is regarded as suspicious in several respects The main problem is concerned with the authentication and accuracy of computer records. It is almost as if the technology is believed to be inherently inaccurate. (10) Section 69 PACE requires some minimum proof of accuracy before the document is admissible. The court must be satisfied of the reliability of the statement as a true record of what the witness observed and also of its authenticity as an accurate record of what was intended to be recorded. As a result it is necessary to show that at all material times the computer had been functioning properly, or at least that any malfunction had not affected the accuracy of the information.

It was envisaged by the Criminal Law Revision Committee (CLRC 1972, para 259) that there would be many cases where the document might have become corrupted by software errors or hardware malfunctions. It is the contention of this article that this suspicion was probably unfounded on the basis that there has been has been no tangible evidence to date illustrating why computer records are likely to be less accurate than those contained on paper. Paper based records are also susceptible to alteration and deterioration yet, where it is alleged that such alteration has taken place, the paper document remains admissible and the challenge goes to the question of its weight as evidence, to be decided on the basis of the evidence called to prove falsification or authentication.

Regarding documentary evidence para 3 of Schedule 2 to the Criminal Justice Act 1988 provides that:

"In estimating the weight, if any, to be attached to ... a statement [given in

evidence under section 23 or section 24] regard shall be had to all the circumstances from which any inference can reasonably be drawn as to its accuracy or otherwise".

Although no particular circumstances are specified, it seems safe to assume that regard may be had, for example, to the following matters: whether the person who made the statement in a document did so contemporaneously with the occurrence or existence of the facts dealt with in the statement; whether any person who supplied the information did so contemporaneously with the occurrence or existence of the facts dealt with in that information; and whether or not such persons or the 'creator' of the document containing the information had any incentive to conceal or misrepresent the facts.

In stark contrast to this, unless it can be shown that there is no chance of unauthorised use of a computer system, or of system failure, the same document stored on computer is inadmissible under the additional requirements of section 69 PACE (eg McKeown v DPP).

Doubts concerning the accuracy of information recorded on computers apply equally to paper-based systems, as do those concerning authentication. As with paper records, the necessary degree of authentication can be proved through oral and circumstantial evidence, if available, or via technological features of the system or record. (11) Although a paper document can be authenticated by its author appending a signature, various technical ways of authenticating c