

## IN THE SUPREME COURT OF JUDICATURE—COURT OF APPEAL

Before: LORD JUSTICE SACHS  
LORD JUSTICE BUCKLEY and  
LORD JUSTICE ORR

5                   20th to 23rd, 26th to 28th, 30th April, 3rd to 7th, 10th to 14th,  
17th to 21st, 24th to 27th May, 23rd and 28th July, 1971.

THE GENERAL TIRE & RUBBER COMPANY v. THE FIRESTONE TYRE  
AND RUBBER COMPANY LIMITED AND OTHERS

10                   *Patent—Action for infringement—Petition for revocation—Invalidity—Anticipation*  
*—Obviousness—Ambiguity—Commercial success—Mere collocation—Common general*  
*knowledge—Patent held valid and infringed—Appeal by defendants dismissed.*

*Patents Act, 1949, s. 32(1)(e), (f), (i).*

15                   *In an action for infringement of patent, the plaintiffs' patent relating to the making of*  
*oil-extended rubber, suitable for the manufacture of tyre treads, was held valid and*  
*infringed by the trial judge. The defendants appealed to the Court of Appeal, where the*  
*proceedings turned on the three issues of anticipation, obviousness, and ambiguity.*  
*Under anticipation, the defendants relied on four documents. Under obviousness,*  
*questions raised included whether there was any inventive step in the process; how*  
*obviousness should be assessed; and whether and to what extent the commercial success*  
*of the patented process should be taken into account. It was pressed for the defendants*  
*that the process was not an invention but either an application of what was already*  
*known or a discovery that the results of a known process were wider and better than had*  
*previously been realised; that rival companies arrived at the same solution shortly after*  
*the plaintiffs; and that commercial success was due to other factors (e.g., the advent of*  
*20 cold rubber and of a special carbon black (H.A.F.)) and to needs resulting from the*  
*Korean War, rather than anything that the plaintiffs had done. The defendants contended*  
*that the addressee for the purposes of considering obviousness was to be deemed to be*  
*a man who as regards every potentially relevant specification "sits down, reads and knows*  
*every word of it" and was a man with "an enormous memory". In the alternative they*  
*30 argued, having regard to dicta in the Technograph case (infra), that the addressee had*  
*to be taken to have made a diligent search. Under ambiguity, the defendants concentrated*  
*on the difficulties that could ensue from the use of computed Mooney (a method of*  
*measuring resistance to shear devised by the plaintiffs for the purpose of the patent in*  
*suit) by anyone who wished to know whether he was about to infringe the patent.*

35                   Held, dismissing the appeal, (1) that the invention claimed was not anticipated by  
any of the cited documents, that it was not obvious, and that the objection of ambiguity  
was not established.

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(2) *That, in determining whether or not a patentee's claim had been anticipated by an earlier publication, the publication and the claim had each to be construed as at their respective relevant dates by a reader skilled in the art, which reader could, if the art was one having a highly developed technology, be a team. If the prior publication contained a clear description of, or clear instructions to do or make, something that would infringe the patentee's claim if carried out after grant of the patentee's patent, the claim would be anticipated. If carrying out the directions in the prior publication would inevitably result in something being made or done which would infringe there would be anticipation. If, on the other hand, the prior publication contained a direction which was capable of being carried out in a manner which would infringe, but would be at least as likely to be carried out in a way which would not do so, the patentee's claim would not be anticipated, although it might fail on the ground of obviousness. To anticipate the claim, the prior publication had to contain clear and unmistakable direction to do what the patentee claimed to have invented. There was on the facts of the case no anticipation by any of the cited documents.*

*Flour Oxidizing Co. Ltd. v. Carr & Co. Ltd.* (1908) 25 R.P.C. 428; *B.T.H. Co. Ltd. v. Metropolitan Vickers Electrical Co. Ltd.* (1928) 45 R.P.C. 1; *Molins v. Industrial Machinery Co. Ltd.* (1938) 55 R.P.C. 31 referred to.

(3) *That the word "obvious" was a much used word and that it did not seem that there was any need to go beyond the primary dictionary meaning of "very plain". It was unnecessary to come to a decision on the important question as to whether the words "known or used" in section 32(1)(f) (obviousness) had the same meaning as in section 32(1)(e) (anticipation), on which question there had been a divergence of opinion in the House of Lords in the Technograph case (infra), Lord Reid having stated (obiter) that the words should have the more natural meaning of what was or ought to have been known to a diligent searcher. As advised the court would, if it were open to it, be disposed to hold that "known" in head (f) did not include everything coming within the definition of "published" in section 101. No authority binding on the court had been cited which seemed to make it necessary to give the word "known" in head (f) a meaning other than one natural in relation to a real person who was a skilled addressee—and that meaning would include what a competent addressee ought to know, but would not burden him with anything further in the nature of constructive notice. The court doubted whether two of the documents relied on would have been discovered in the course of a diligent search, but, on any view of the law, the appellants had failed by a considerable margin to establish their plea of obviousness. The plaintiff's commercial success was of value on that issue.*

*Technograph Printed Circuits Ltd. v. Mills & Rockley (Electronics) Ltd.* [1971] F.S.R. 188; [1972] R.P.C. 346 considered; *Longbottom v. Shaw* (1891) 8 R.P.C. 333 referred to; dicta in *British Westinghouse Electric and Manufacturing Co. v. Braulik & Co. Ltd.* (1910) 27 R.P.C. 209 and *Samuel Parkes & Co. Ltd. v. Cocker Bros. Ltd.* (1929) 46 R.P.C. 241 applied. Observations on common general knowledge and mere collocation.

(4) *That the question whether a patentee had sufficiently defined the scope of his claims had to be considered in relation to the facts of each case, that allowance was to be made for any difficulties to which the circumstances gave rise, and that all that was required of the patentees was to give as clear a definition as the subject matter admitted of. The issue of definition was to be considered as a practical matter and little weight was to be given to puzzles set out at the edge of the claim which would not as a practical*

matter cause difficulty to a manufacturer wishing to satisfy himself that he was not infringing the patent. The definition of the scope of a claim was not necessarily insufficient because cases might arise in which it was difficult to decide whether there had been an infringement or not provided the question could be formulated which the court had to answer in deciding the issue of infringement. The defendants case under section 32(1)(i) failed.

*British Thomson-Houston Co. Ltd. v. Corona Lamp Works Ltd.* (1922) 39 R.P.C. 49;  
*Cleveland Graphite Bronze Co. and Vandervell Products Ltd. v. Glacier Metal Co. Ltd.*  
(1950) 67 R.P.C. 149 applied.

10 Cases referred to in judgment:

- Hills v. Evans* (1862) 4 De G. F. & J. 288; 31 L.J. Ch. 457.  
*American Braided Wire Co. v. Thomson & Co.* (1889) 6 R.P.C. 518.  
*Vickers Sons & Co. v. Siddell* (1890) 7 R.P.C. 292.  
*Longbottom v. Shaw* (1891) 8 R.P.C. 333.
- 15 *Flour Oxidizing Co. Ltd. v. Carr & Co. Ltd.* (1908) 25 R.P.C. 428.  
*British Westinghouse Electric and Manufacturing Co. v. Braulik* (1910) 27 R.P.C. 209.  
*Natural Colour Kinematograph Co. Ltd. v. Bioschemes Ltd.* (1915) 32 R.P.C. 256.  
*British Thomson-Houston Co. Ltd. v. Corona Lamp Works Ltd.* (1922) 39 R.P.C. 49.  
*British Thomson-Houston Co. Ltd. v. Metropolitan-Vickers Electrical Co. Ltd.* (1928)  
20 45 R.P.C. 1.  
*Parkes (Samuel) & Co. Ltd. v. Cocker Bros. Ltd.* (1929) 46 R.P.C. 241.  
*British Acoustic Films Ltd. v. Nettlefold Productions Ltd.* (1936) 53 R.P.C. 221.  
*Molins v. Industrial Machinery Co. Ltd.* (1938) 55 R.P.C. 31.  
*Raleigh Cycle Co. Ltd. v. H. Miller & Co.* (1948) 65 R.P.C. 141.
- 25 *Cleveland Graphite Bronze Co. and Vandervell Products Ltd. v. Glacier Metal Co.*  
(1949) 66 R.P.C. 157; (1950) 67 R.P.C. 149.  
*Martin and Biro Swan Ltd. v. H. Millwood Ltd.* (1956) R.P.C. 125.  
*Johns-Manville Corporation's Patent* [1967] R.P.C. 479.  
*Technograph Printed Circuits Ltd. v. Mills & Rockley (Electronics) Ltd.* [1969] R.P.C.  
30 395 and [1971] F.S.R. 188; [1972] R.P.C. 346.

Additional cases referred to in argument:

- Boulton v. Bull* (1795) 2 Hy. Bl. 463.  
*Neilson v. Harford* (1841) 1 W.P.C. 331.  
*Crane v. Price* (1842) 1 W.P.C. 393.
- 35 *Arnold v. Bradbury* (1871) 6 Ch. App. 706.  
*Nobel's Explosive Co. Ltd. v. Anderson* (1894) 11 R.P.C. 519.  
*Lancashire Explosives Co. Ltd. v. Roburite Explosives Co. Ltd.* (1895) 12 R.P.C. 470.  
*Hickton's Patent Syndicate v. Patents and Machines Improvements Co.* (1909) 26  
R.P.C. 61.
- 40 "*Z*" *Electric Lamp Manufacturing Co. v. Marples Leach & Co.* (1910) 27 R.P.C. 737.  
*Gillette Safety Razor Co. v. Anglo American Trading Co.* (1913) 30 R.P.C. 465.  
*Armstrong Whitworth & Co. v. Hardcastle* (1924) R.P.C. 543.  
*Sharpe and Dohme Inc. v. Boots Pure Drug Co.* (1928) 45 R.P.C. 153.  
*Pope Appliance Corporation v. Spanish River Pulp and Paper Mills Ltd.* (1929) 46  
45 R.P.C. 23.  
*British Celanese Ltd. v. Courtaulds Ltd.* (1935) 52 R.P.C. 171.  
*No Fume Ltd. v. Frank Pitchford & Co. Ltd.* (1935) 52 R.P.C. 231.  
*Electric and Musical Industries Ltd. v. Lissen Ltd.* (1937) 54 R.P.C. 5.  
*Wood v. Gonshall Ltd.* (1937) 54 R.P.C. 37.

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- Non-Drip Measure Co. v. Strangers* (1943) 60 R.P.C. 135.  
*Allmann Svenska Elektriska A/B v. The Burntisland Shipbuilding Co.* (1952) 69 R.P.C. 63.  
*Slumberland Ltd. v. Burgess Bedding* (1951) R.P.C. 87.  
*Benmax v. Austin Motor Co.* (1955) 72 R.P.C. 39. 5  
*Fomento Industrial S.A. v. Mentmore Manufacturing Co.* [1956] R.P.C. 87.  
*Van der Lely N.V. v. Bamfords Ltd.* [1963] R.P.C. 61.  
*Olin Mathieson Chemical Corp. v. Biorex Laboratories Ltd.* [1970] R.P.C. 157.  
*American Cyanamid Co. (Dann's) Patent* [1970] F.S.R. 443; [1971] R.P.C. 425.

This was an appeal by the defendants, The Firestone Tyre and Rubber Company Limited and others, from the judgment of Graham, J., delivered 29th June 1970 and reported at [1971] R.P.C. 173, holding that letters patent No. 737,086 of The General Tire & Rubber Company, were valid and infringed. The facts of the case appear from the judgment of Graham, J. and of the Court of Appeal. The patent specification is included in the report in [1971] R.P.C. 173, which report also includes the references to transcripts of evidence and other documents. 15

The judgment of the Court of Appeal is divided into sections, and for the convenience of readers the page references to the various sections are given below:—

1. INTRODUCTION (470).
2. COURSE OF PROCEEDINGS (470). 20
3. MAKING OF COMPOUND FOR TYRE TREADS (472).
  - (a) PROCESSES (472).
    - Stage (i) (473).
    - Stage (ii) (473).
    - Stage (iii) (474). 25
    - Stage (iv) (474).
  - (b) REQUISITES OF A COMPOUND AND OF THE PROCESSES FOR MAKING IT (475).
4. HISTORY OF PRODUCTION OF SYNTHETIC RUBBER AND COMPOUNDS TO 1950 (475).
5. THE GAP AND THE PROBLEM (477).
6. THE ISSUES BEFORE THIS COURT (478). 30
  - (i) Anticipation (s. 32(1)(e)) (478).
  - (ii) Obviousness (s. 32(1)(f)) (479).
  - (iii) Insufficient definition (Ambiguity) (s. 32(1)(i)) (479).
7. THE ONUS ON THE APPELLANTS (480).
8. DATES OF IMPORTANCE (480). 35
9. A. COMMON GENERAL KNOWLEDGE (481).
  - B. ANTICIPATION (484).
    - (1) General (484).
    - (2) The specification (486).
    - (3) Semperit (a) (492). 40
    - (4) Semperit (c) (493).
    - (5) Wilmington (494).
  - C. OBVIOUSNESS (497).
    - (1) General (497).
    - (2) Semperit and Wilmington specifications (498). 45
    - (3) Pre-Nov. 1950—Attitudes towards the problem of the gap (500).
    - (4) Commercial success (502).

[No. 17]

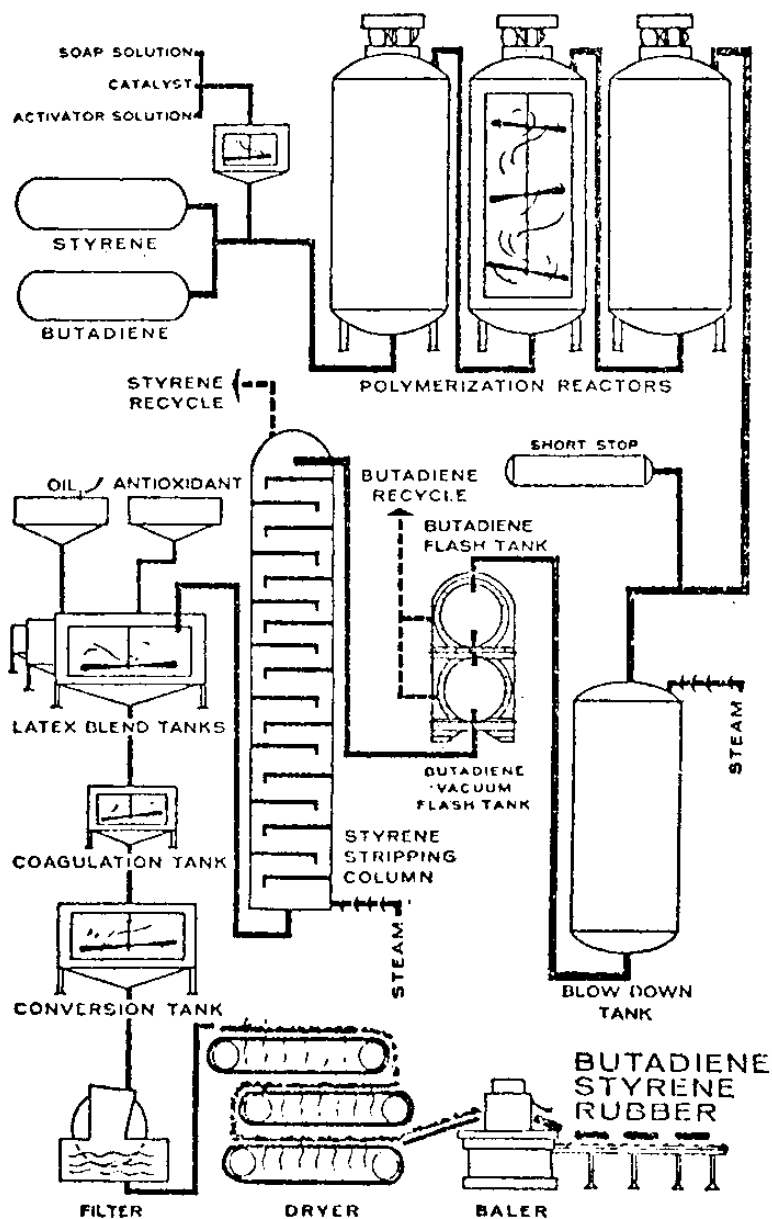
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D. INSUFFICIENT DEFINITION (506).

- (1) General (506).
- (2) Computed Mooney Test (507).
- (3) The attack on Computed Mooney (509).
- 5 (4) The Plaintiffs' argument as to Computed Mooney (511).
- (5) Construction of the Specification (513).
- (6) Relevant Authorities (514).
- (7) Conclusion (515).

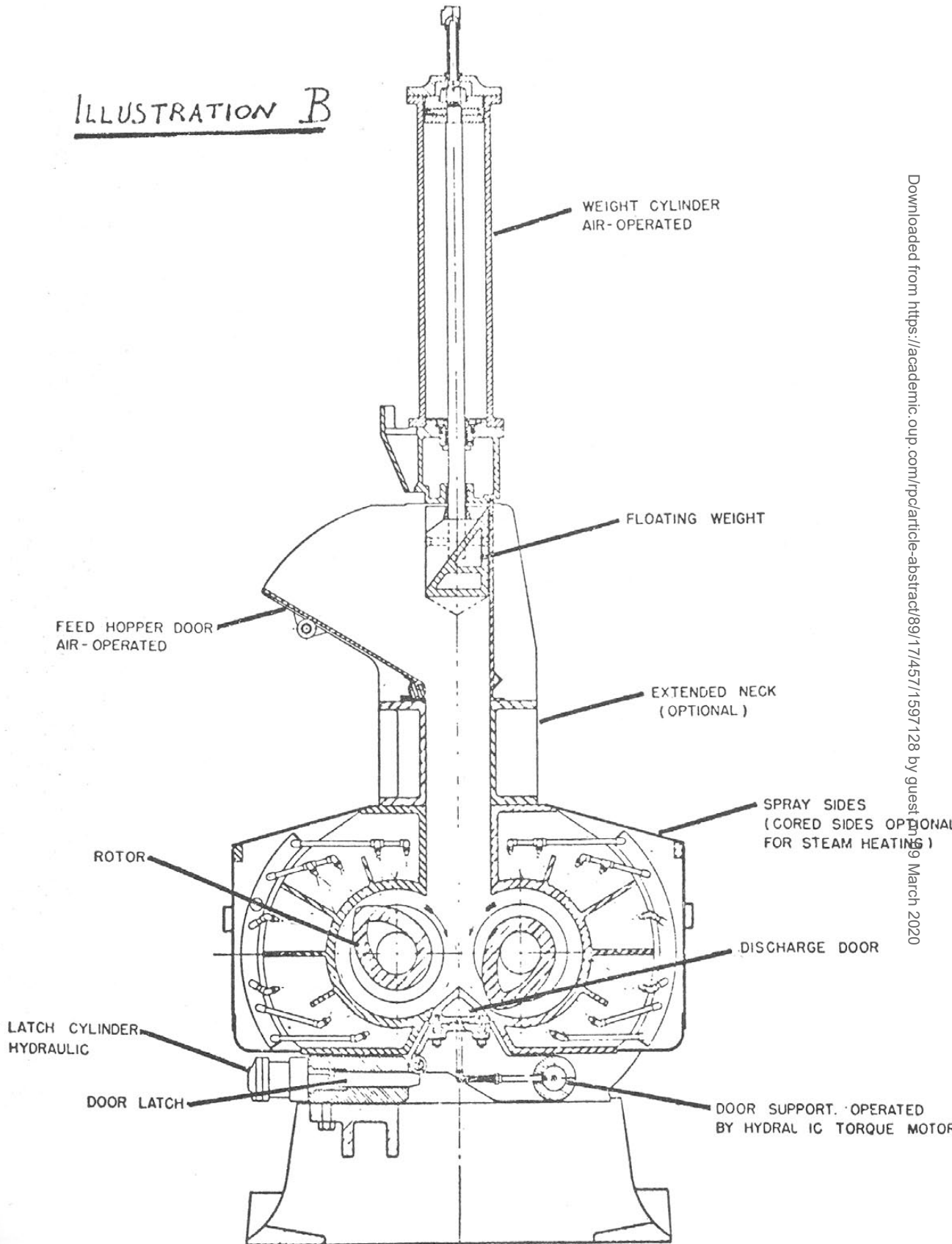
The two illustrations referred to in the judgment are reproduced overleaf—

## ILLUSTRATION A

Fig. 1. THE PRODUCTION OF  
BUTADIENE-STYRENE RUBBER

Cross-section view of a modern drop-door Banbury mixer. This design improvement results in cleaner, faster operation. Most older size 3A and 11 Banbury mixers can be converted to this construction.

ILLUSTRATION B



**General Tire & Rubber Company v. [1972] R.P.C.  
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*Sir Lionel Heald, Q.C., Stephen Gratwick, Q.C., and J. G. Drysdale*, instructed by *Bristows, Cooke & Carpmael*, appeared for the plaintiffs (respondents). *S. W. Templeman, Q.C., William Aldous and David Young*, instructed by *Herbert Smith & Co.*, appeared for the defendants (appellants).

*Templeman, Q.C.*—The only issue is the validity of the patent-in-suit. At the 5  
priority date of the patent there were three methods of softening a tough rubber,  
namely mastication, heat softening, and adding oil. The patentees claim to have  
invented the third method, but that method had already been invented by the Austrian  
firm of Semperit during the second world war and was also the subject of a patent 10  
independently taken out in the U.S.A. by a company called Wilmington. A feature  
of the claims of the patent-in-suit is that the oil should be added in such a way that it  
is distributed through and uniformly absorbed by the rubber before it has been  
appreciably deteriorated by mastication and it is said that this means that breakage of  
the molecular chains are thereby avoided. This is however mere jargon verbiage and 15  
window dressing and the learned judge wrongfully accepted this theory. We say that  
all that the patent-in-suit directs you to do is to put the oil into the rubber; softening  
and degradation are the same thing. The learned judge has been blinded by the  
commercial success of the invention into an erroneous judgment.

As to anticipation the Court must construe the prior documents with any help of  
experts limited to understanding the meaning of specific words. The law is set out in 20  
*Terrell, 11th edition* pages 115 to 118. The documents must be construed as at their  
respective publication dates as addressed to an intelligent and knowledgeable tyre  
manufacturer with his scientist, and compounder having all the historical and  
scientific knowledge available at that date. See *Hills v. Evans* (1862) 4 De G.F. and J.  
288; *E.M.I. v. Lissen* (1937) 54 R.P.C. 5 at 31; *Molins v. Industrial Machinery* (1938) 25  
55 R.P.C. 31; *Martin v. Millwood* [1956] R.P.C. 125; *Van der Lely v. Bamfords* [1963]  
R.P.C. 61. The Wilmington specification construed as a whole gives directions to  
soften any tough synthetic rubber with oil. The patent-in-suit is concerned with  
making a tyre tread from tough synthetic rubber using oil instead of mastication. In  
the Austrian Semperit patent application 155,625 the Buna rubber was tough and of 30  
high Mooney viscosity and the only room for argument in relation to the claims of the  
patent-in-suit is whether the oil is added in such a way that it is distributed through  
and uniformly absorbed by the rubber before it has been appreciably deteriorated by  
mastication. Insofar as this is a meaningful integer, the skilled compounder will do  
this anyway in carrying out Semperit. Another Austrian Semperit application namely 35  
157,457 is likewise an anticipation on the same basis.

As to obviousness, the learned judge paid insufficient attention to the prior docu-  
ments we rely upon. The notional problem is merely “How to make tough rubbers  
processable so as to make a tyre tread”; See *Sharpe and Dohme v. Boots* (1928) 45  
R.P.C. 153. As to the distinction between novelty and obviousness see *Terrell* pages 40  
112–120. In judging obviousness, documents can be “mosaicied” *Allmana Svenska v.*  
*Burntisland* (1952) 69 R.P.C. 63. See also *Martin v. Millwood* (supra). As to “com-  
mercial success” see *Terrell* pages 122–123; *Longbottom v. Shaw* (1891) 8 R.P.C. 333.  
The proper test for obviousness is whether you think there is a reasonable chance of  
getting a useful result from what you learn from the prior art; *Johns-Manville* 45  
*Corporation's Patent* [1967] R.P.C. 479. See also *Technograph v. Mills & Rockley*  
[1969] R.P.C. 395 and [1971] F.S.R. 188. The addressee for purposes of obviousness  
is an unimaginative skilled technician; he must be assumed to have read the whole  
of the prior art. The court should not take into account the subjective reactions (such  
as surprise) of persons who had not read the whole of the relevant prior art. 50



As to “scope of claim not sufficiently and clearly defined” there is no guidance as to what is meant by “*appreciably* deteriorated by mastication”. The “Computed Mooney” of the rubber is not constant but varies according to the amount of oil added. Computed Mooney is not a relative term and the principles of *B.T.H. v. Corona* (1922) 39 R.P.C. 49 do not apply. For the relevant principles of law see *Terrell* pages 93 to 96.

*Aldous* followed—Section 32 of the Patents Act 1949 is a complete code on the matter of validity; see *American Cyanamid's Patent* [1970] F.S.R. 443 ([1971] R.P.C. 425). On anticipation, the application of the principles of *Hills v. Evans* (supra) is illustrated by *Molins v. Industrial Machinery* (supra); there is anticipation if anything disclosed in the prior document falls within the claims of the patent-in-suit. As to obviousness, the skilled man must be assumed to know the contents of standard textbooks and it is assumed that you then place before him the pleaded prior art.

It is immaterial whether an invention was made by the inventor without knowledge of the matters which must be taken into account by the court; *Allmana Svenska v. Burntisland* (supra). The only question to be considered in relation to each prior document is; is the step which differentiates the document in question from the claims of the patent-in-suit an obvious thing to do? Having considered this question in relation to each document separately you consider them all together and consider whether the skilled man would dovetail them together and if so what would he take out of which? A person is entitled to carry out any process which has been disclosed and equally he is entitled to carry out that process with obvious modifications. It is irrelevant whether the document is widely known or not, but in deciding whether the step not disclosed is obvious you take into account all the knowledge the notional man would have, that is to say widely read publications. (Reference was made to *Slumberland v. Burgess Bedding* [1951] R.P.C. 87 and to *British Celanese v. Courtaulds* (1935) 52 R.P.C. 171).

As to ambiguity of the claims, the point to be considered is whether someone could have been advised whether he infringed or not. If the patentee is to maintain his monopoly he must not give the public problems.

*Sir Lionel Heald, Q.C.*—We support the judgment in its entirety. The principles which the Court of Appeal should adopt are set out in *Benmax v. Austin* (1955) 72 R.P.C. 39. Obviousness is a matter of fact which used to be left to a jury as in *Neilson v. Harford* (1841) 1 W.P.C. 273. See also *Crane v. Price* (1842) 1 W.P.C. 393. The word “obvious” was first used by Lord Herschell in *American Braided Wire v. Thomson* (1889) 6 R.P.C. 518. See also *Vickers v. Siddell* (1890) 7 R.P.C. 292. *Longbottom v. Shaw* (1891) 8 R.P.C. 333. The history of the matter sheds light on whether the invention is obvious, and in particular whether what seems obvious now was obvious when the invention was made. The word “obvious” is a common-sense, clear and strong word [**Sachs, L.J.**—it means “very plain”].

As to anticipation see *Hills v. Evans* (1862) 4 De G.F. & J. 288. Anticipation is a matter of fact which used to be decided by the jury in the light of the directions they received from the court as to the interpretations of the documents. Only publications and common general knowledge available in this country can be considered. Before considering validity at all, the patent-in-suit must be construed. The specification must be read as a whole before the claims are read; *Arnold v. Bradbury* (1871) L.R. 6 Ch.App. 706. Common general knowledge must be taken into account in construing the specification, but not pleaded prior art which is not part of the prior common general knowledge. As to what common general knowledge is, see *British Acoustic*

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*Films v. Nettlefold* (1936) 53 R.P.C. 221. Similarly common general knowledge must be taken into account in construing the pleaded prior documents. The function of the claim is to delimit the monopoly not to explain the invention—this is done in the body of the specification. *E.M.I. v. Lissen* (supra). For there to be anticipation of any claim, all the integers must be disclosed in combination in the prior document. In the patent-in-suit the methods claimed are listed by functional limitations to methods producing the results specified see *No Fume v. Frank Pitchford* (1935) 52 R.P.C. 231; *B.T.H. v. Corona* (1922) 39 R.P.C. 49; *Cleveland Graphite v. Glacier Metal* (1950) 67 R.P.C. 149. The claim should be construed so as to produce a sensible interpretation and one which the patentee would have intended *E.M.I. v. Lissen* (supra).

As to obviousness the commercial success of the invention should be taken into account *B.T.H. v. Corona* (1922) 39 R.P.C. 49 at 79. As to other matters which the court should take into account, see *Haslbury's Laws* Vol. 29 at 46. In judging obviousness, it is permissible to make a mosaic of two or more documents only if it proved obvious to read them together; *Allmana Svenska v. Burntisland* (supra). In the present case there is no evidence that many of the documents relied upon by the defendants were ever read at all let alone part of the common general knowledge. Public knowledge, meaning all knowledge available to the public, must be carefully distinguished from common general knowledge which is what the skilled man is presumed to know. See *Haslbury's Laws* Vol. 29 at 29. An invention can be made by putting together items of common general knowledge *Lancashire Explosives v. Roburite* (1895) 12 R.P.C. 470. A fortiori, this must apply to documents which are not common general knowledge. You must be particularly careful about picking out two particular documents and sewing them together—all the prior documents must be considered. Assumptions must not be made which are only justified by having an inventive idea; *Wood v. Gowshall* (1937) 54 R.P.C. 37. The test for obviousness in *Johns-Manville* [1967] R.P.C. 479 was applicable to the facts of that case but should not be used as a general test without very great care. It is erroneous to consider whether a defendant is entitled to do something. This was not what was said in *Gillette v. Anglo-American* (1913) 30 R.P.C. 465, and this case does not provide a new objection to plead against the validity of a patent. The question to be decided is: is the specific step in question obvious? See *Olin Mathieson v. Biorex* [1970] R.P.C. 157. The addressee is a team consisting of the compounder and the scientist in which the compounder—the practical man—is important.

As to ambiguity, difficulty in proving infringement does not make a claim ambiguous. If a man makes an invention and the product is only capable of definition in terms to some extent indefinite, he is not thereby to be deprived of a patent. See *B.T.H. v. Corona* (1922) 39 R.P.C. 49; *Cleveland Graphite v. Glacier Metal* (1950) 67 R.P.C. 149. In the present case, the evidence shows that there is a problem which prevents the patentee relying on the normal measuring methods; none of the witnesses was able to suggest a better method than that devised by the patentee and the method adopted does not harm anyone who is carrying on a normal business.

Finally it may be of interest to refer to an observation regarding inventions which is found in "*Paradise Lost*" the tenth book, published 1650, in relation to the invention of gunpowder by Satan:

The invention all admired  
and each that he to be the inventor had missed  
So easy it seemed, once done,  
Which yet undone most would have thought, impossible.

(Reference was also made to *Hickton's Patent Syndicate v. Patents and Machines Improvements Co.* (1909) 26 R.P.C. 61. *Boulton v. Bull* (1795) 2 H.Bl. 463. *Non-Drip Measure Co. v. Strangers* (1943) 60 R.P.C. 135. *Technograph v. Mills & Rockley (CA)* [1969] R.P.C. 395. *Flour Oxidising v. Carr* (1908) 25 R.P.C. 428. *Nobel v. Anderson* 5 (1894) 11 R.P.C. 519. *Van der Lely v. Bamfords* [1961] R.P.C. 304. *British Westinghouse v. Branlik* (1910) 27 R.P.C. 209 and *Samuel Parkes v. Cocker Brothers* (1929) 46 R.P.C. 241 at 248).

*Gratwick, Q.C.* followed—As to ambiguity, the cases of *B.T.H. v. Corona* and *Cleveland Graphite v. Glacier Metal* (supra) show that the clarity of a claim must be considered in relation to the facts of the case; there is no absolute test. If the court is satisfied that a real invention has been made the court will seek whether the skilled reader can find out whether he is within the claim and will not weep tears over a defendant who is trying to sail close to the wind. At the edge of the claim there may inevitably be some uncertainty; see *B.T.H. v. Corona* (supra). The proper question to be answered is not; does a particular man know whether he is infringing? but; does the specification enable the court to formulate the question for him to answer?; see *Cleveland Graphite v. Glacier Metal* (1949) 66 R.P.C. 157. One must ask oneself whether the patentee has acted bona fide and has done the best that could be expected of him in the circumstances. The court should not be astute to deprive a patentee of the benefit of a valuable invention; see Lord Parker in *Natural Colour v. Bioschemes* (1915) 32 R.P.C. 256 at 268. The evidence in the present case shows that there is a problem, that the patentees have made a reasonable approach to dealing with the problem, and that no one can suggest a better way of doing it. The defendants' attack is merely a matter of putting puzzles at the edge of a claim for the purpose of showing difficult which does not exist in practice. The inventor can do no better than use the state of knowledge existing at the date of his specification; *Z Electric Lamp v. Marples Leach* 27 (1910) R.P.C. 737 at 745. Ambiguity should not be tested by using a product unknown at the date of the specification or contrary to the advice in the specification. The only place where difficulty can arise in the present case, is at the edge of the claim and difficulties in proving infringement do not make a claim invalid. See *Cleveland Graphite v. Glacier Metal* (1949) 66 R.P.C. 157; *Raleigh v. Miller* (1948) 65 R.P.C. 141 at 159. One must also bear in mind that a claim may be infringed through the pith and marrow of the invention being taken; see *Van der Lely v. Bamfords* [1963] R.P.C. 61 at 75.

As to novelty, one must consider in relation to each of the documents cited whether all the specific details are disclosed and if not, whether the reader would assume from his ordinary knowledge that he should carry out the steps in question and if so how. One must also instruct oneself with the surrounding circumstances as they exist; *Hills v. Evans* (supra). If one cannot find all the details in the early document, it may still be possible that the prior document and the patent-in-suit were really saying the same thing in different words. The question to be answered in such a case is; does the prior document give clear and unmistakable directions which when carried out will inevitably result in something coming within the claims of the patent? *Flour Oxidising v. Carr* (1908) 25 R.P.C. 428. *Fomento v. Mentmore* [1956] R.P.C. 87, *Cleveland Graphite v. Glacier Metal* (1950) 67 R.P.C. 149 at 155. With the Semperit documents, the defendants have to select the premix from the total mix, to select the Banbury from the alternatives of Banbury and mill, and to propose that the Banbury be operated in the way set out in the patent-in-suit and not in the way then conventional. This is not anticipation—it is not enough to show what a man might do nor that the prior document is not inconsistent with the patent-in-suit; *Fomento v. Mentmore*; *Flour Oxidising v. Carr* (supra). Although it was known that degradation was

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deleterious, it was not known until the date of the patent-in-suit that something could be done to avoid it. There are no directions in *Semperit* to carry out mixing in any particular way and the compounder would use the conventional way.

With regard to the Wilmington prior document, one must see whether there are clear and unmistakeable directions to do something specific or whether there is nothing more than “apparent generality” which is not enough see *Hills v. Evans* (supra). For there to be a prior disclosure of the invention all the features of the claim must be shown to be disclosed in combination; see *Molins v. Industrial Machinery* (supra). One must not approach the prior document with a predisposition to find in it something which was discovered later. *Cleveland Graphite v. Glacier Metal* (1950) 67 R.P.C. 149 see also *Armstrong Whitworth v. Hardcastle* (1924) 42 R.P.C. 543. 5 10

As to obviousness, if one is to start from a document like *Semperit* one must be supplied with a reason for doing so. One must look at the whole history of the matter and look into the kind of questions discussed in, for example, *Vickers v. Siddell* (supra) and *Pope v. Spanish River* (1929) 46 R.P.C. 23. One can take into account the existence of all the relevant prior published information but one must not impose an *ex post facto* selection. The words in the sections of the Act relating to anticipation and to obviousness are the same in regard to what can be relied upon and we do not dispute in these proceedings the proposition that no prior document however obscure can be shut out altogether. See *Technograph v. Mills & Rockley* [1971] F.S.R. 188. One must however be particularly careful not to apply *ex post facto* knowledge to an obscure document. See *Blanco-White; Patents for Inventions* page 120. *Wood v. Gowshall* (supra). The *Gillette Defence* approach is not to be used as a short cut to escape the necessity of applying authorities in the ordinary way. The inventors in this case had the idea of getting oil into the rubber without breaking molecular chains; they found out how to do it, and brought about a revolution in the industry which involved very large savings in costs. 15 20 25

*Templeman, Q.C.* in reply—Your lordships are concerned with the invention not the theory or object of the invention. The theory is that you do not break chains and the object may have included the preservation of long molecules. This has nothing to do with anticipation obviousness or ambiguity. 30

General Tire were the first to invent oil-extended rubber if you ignore *Semperit* and Wilmington. But you cannot ignore them, the law requires that you take into account a hypothetical addressee who sits before each document and reads and knows all about every word in it. 35

Anticipation is established if the General Tire patent, when properly construed, includes something previously published in *Semperit* or Wilmington. The question is—what would the skilled addressee in England have learned from *Semperit*? In *Semperit* there are clear and unmistakeable directions to soften a tough rubber hitherto considered unprocessable with oil and use it to make a tyre tread compound. This is in accordance with *Flour Oxidizing v. Carr* (supra). There is no “special characteristic” in the General Tire invention and *Fomento v. Mentmore* (supra) does not apply. 40

Similarly, Wilmington gives clear and unmistakeable directions to make a tyre tread compound by softening a tough rubber with more than 20% oil and carbon black. This is anticipation. If you do Wilmington with high Mooney rubber you inevitably 45

get a result within claim 1 of the patent-in-suit [Buckley, L.J.—It is a thing you may do under Wilmington, not a thing you must do]. It tells you to do it as much as it tells you to do it with any other rubber.

As to obviousness, the hypothetical addressee is a man who knows and sees all the documents has an enormous memory and reads them all. Obviousness is always considered in the light of specific documents. One must assume that the “diligent searcher” would have found Semperit, and read every word, but Semperit would not be part of the common general knowledge. One must ignore the subjective reactions of witnesses who have not done what the hypothetical addressee must be assumed to have done. If there is any distinction between Semperit and the patent-in-suit it resides in getting the oil absorbed without appreciable deterioration of the rubber. The skilled man wants to avoid breaking chains and he will find in Wilmington how to do this. He will also obtain assistance from Macmillan. The step differentiating the patent-in-suit from Semperit is only a small one. The question “Why was not it done before?” is answered when one considers the onset in 1950 of a shortage and consequently a high price, of natural rubber owing to the Korean War, leading to a need to economise on synthetic material. Other factors include development of cold rubber and better carbon black. Also one suspects that no one in practice ever sat down with Semperit Wilmington and Macmillan and all the other documents and considered them as the hypothetical addressee must be assumed to do. You can take two or three prior specifications and look at them together provided you also consider the rest of the prior knowledge. The *Gillette* case (supra) shows that you should consider all the specifications prior to the patent-in-suit and assume they are in the mind of the addressee and ask the question—is there patentable variation when you come to the patent-in-suit? Although some prior documents show a prejudice against using oil, the hypothetical addressee having regard to Semperit, Wilmington and Macmillan would not be so prejudiced. The hypothetical addressee is a combination of a scientist and a compounder and one must therefore ignore the subjective prejudices of compounders who have given evidence in this case, a fortiori when they may never have read all the documents. As to the relevant history, we accept the relevance of common general knowledge and literature and “why was not it done before?” but not subjective surprise. The notional addressee with all the literature in his mind including Semperit, Wilmington and Macmillan would know how to make a tyre tread according to the method of the patent-in-suit.

As to ambiguity, *B.T.H. v. Corona* (supra) does not assist the Plaintiffs since they have invented an artificial test for the purposes of de-limiting the boundary of the claim which gives contradictory answers. You cannot extract from *B.T.H. v. Corona* a general principle of beneficial construction such as the plaintiffs contend for. The limit is set at 90 computed Mooney and it is irrelevant whether people in fact use rubbers of that Mooney; in any event there is no evidence that they do not [Sachs, L.J.—There is no evidence that anybody *does* use such rubbers either.] The patent-in-suit leads one to believe that there is one computed Mooney per polymer and there is no justification for averaging results found with different loadings of oil. The variations found are not genuine “scatter” but are different results with different oil loadings.

The following judgment of the Court was delivered on 23rd July, 1971 by Sachs, L. J.—

## (1) INTRODUCTION

This is an appeal from the judgment given on 31st July 1970 by Graham, J. in proceedings in which the respondent plaintiffs asserted claims for the infringement of patent No. 737,086 (priority date 20th November 1950) and the appellant defendants sought its revocation. It was not contested that if all of the claims of the patent were valid, some 18 had been infringed by the defendants: so the result of the proceedings depended on whether grounds for revocation were established. 5

The patent-in-suit was for a process for making a compound suitable for tyre treads by mixing synthetic rubber with oil and carbon black (a mixture commonly referred to as "oil-extended" rubber) and for the compound thus made. It was common ground that after the plaintiffs publicised the process in June 1951, it was rapidly taken into general industrial use to the extent that will be mentioned later in this judgment: it was correctly stated in the judgment that "the importance of the method cannot be gainsaid". 10

The attack on the patent at first instance had, by the time judgment came to be given, concentrated on seeking to establish anticipation under section 32(1)(e) of the Patents Act, 1949; obviousness and absence of any inventive step under section 32(1)(f); and absence of sufficient and clear definition or ambiguity, under section 32(1)(i). On each of these three heads the onus, of course, lay on those who sought revocation; in each instance it was held that the appellants failed; and as regards each head the attack, with some modifications, has been renewed before this court. 20

The judgment is reported in convenient form in the Fleet Street Patent Law Reports [1970] page 268, and for the purposes of this appeal we have used that report, after there had been inserted into it those full and helpful references to pertinent evidence and documents which appeared in the transcript supplied by the shorthand writers.\* When referring to passages in that judgment we will simply cite the relevant page in that report. 25

## (2) COURSE OF PROCEEDINGS

The proceedings in this country, with which alone we are concerned, commenced (see [1970] F.S.R. at 270)† in 1963, when a petition for revocation of the patent was presented by the International Synthetic Rubber Company Limited ("I.S.R."), one of the defendants. In 1964 and 1967 actions for infringement were commenced by the plaintiffs, and in them counterclaims for revocation were made. On 7th May, 1968, an order was made consolidating the three sets of proceedings. 30

On 2nd October 1969, there commenced a hearing before Lloyd-Jacob, J.: this occupied 34 days, 19 of which were devoted to evidence. Unhappily, after the conclusion of that hearing, but before judgment could be delivered, this learned judge died—to the grievous loss of all concerned in patent cases. 35

On 8th April 1970, Graham, J. commenced to rehear the case. By agreement this trial, which occupied 25 days, took place upon the transcript of the evidence as recorded at the first hearing—no further evidence being adduced. 40

\* These are included in the report at [1971] R.P.C. 173.

† [1971] R.P.C. at 211.

The issues and relevant questions of fact as raised in the pleadings, the requests for admissions, the particulars of objections and other notices on the court record cover in all close on 100 pages (Vol. D.1): they were thus voluminous. Moreover, the parties came to court with material gathered from worldwide litigation under various systems of law relating to the patent-in-suit—we were told that in the U.S. proceedings alone 5 some 300,000 documents were disclosed or used.

Nonetheless Graham, J. (who in the circumstances we will refer to as the trial judge), with the co-operation of counsel, succeeded in analysing the massive material in a way to which we wish to pay tribute: at the same time he crystallised the issues 10 and stated the law in a manner which has been most helpful. As regards the evidence he said ([1970] F.S.R. at 272):\*

“the decision in this case depends not on questions of disputed fact but on what are the proper inferences to be drawn from the primary historical and technical facts, which are very largely not in issue”.

15 He further said:

“it is very fortunate that all the witnesses in this case, as counsel on both sides agreed and as Lloyd-Jacobs, J. clearly considered from comments which he made during the hearing, were of considerable calibre and gave their evidence with candour, clarity and lack of partisanship”.

20 Insofar as there were conflicts of expert evidence he was able to resolve them with the aid of the submissions of counsel—to which he gave appropriately warm praise. In this behalf he was no doubt assisted by his own special experience and could thus assess whether on any particular point witnesses had been able to keep within or may have strayed outside those “limits of objectivity” to which Mr. Templeman referred, and 25 could also discount the effect of that hostility which existed between on the one hand the plaintiffs and on the other the United States Office of Rubber Reserve and some of the appellants—as appears clearly from a number of documents and from some of the oral evidence.

In this court the hearing has taken some 27 days. At the outset, in view of the number 30 of technical words and phrases unfamiliar to this “non-expert court” (to borrow the language of Willmer, L.J. in the *Johns-Manville* case [1967] R.P.C. 479 at 496) that were to be found in the evidence and in the judgment, we indicated to counsel that they should not hesitate, in their discretion, to request us to nominate a scientific adviser under the provisions of R.S.C. Ord. 40, r. 1, if such a course appeared to be 35 in the interests of the parties. We received no such request and consider that the discretion of counsel was wisely exercised. Despite the necessary ramifications of the technology discussed, we found that we had to deal in substance with the application of well-charted law to issues of fact that were reasonably plain despite being in some respects difficult to resolve.

40 Before going further into these matters, we wish to express our deep appreciation of the help we received from all the counsel concerned in the arduous task of presenting to us the law and the relevant facts—not least to Mr. Gratwick for his assistance on the many technical matters which became the subject of discussion before us.

So far as facts are concerned, the difficulties stemmed in the main from the by no 45 means easy task of obtaining a reasonably exact and full understanding of the many

\* [1971] R.P.C. at 213.

diversified practical problems that faced the tyre manufacturing industry in its transition from almost exclusive use of natural rubber to widespread use of synthetic rubber; of the interlocking nature of those problems—for a process tending to solve one could well have an adverse side effect on another; and of the particular problems to which individual specifications of different dates were addressed in the light of what was then known. These difficulties were increased by the fact that neither in the specifications nor in the evidence of the experts was the same language necessarily used in relation to each problem, and that the specifications were each in turn in the main concerned with and directed towards some identifiable end result rather than such theories as might be enunciated in them. It was indeed the end results that naturally mattered to this industry, which was somewhat conservatively and empirically minded in view of its massive machinery and equipment and the need to use it economically.

The nature of these various interlocking problems will be specified later: they were the subject of a great bulk of evidence employing highly technical phrases, but to which reference can nonetheless be made, for the purposes of this judgment, in relatively simple terms.

It is at this point convenient to mention that, as the trial judge had attached some weight ([1970] F.S.R. 282 and 290)\* to a visit paid by him to the tyre factory of the first-named appellants at Brentford, we acceded to a suggestion that we, too, should go there, should view those processes which the trial judge had observed, and should see two instructive films that had been shown to him—“Making of a tyre”—Firestone (U.S.) 1947, and “Man-made rubber”—Dunlop 1953. We found the two films helpful in that they made clear in visual form the sequence of the processes at the various stages which lead to the making of compounds for use as tyre treads. As regards what could actually be seen at the factory, one naturally cannot there see any of the processes referred to as Stages (i) and (ii) in the next section of this judgment, nor can one observe what occurs inside that very important machine (much referred to in the evidence), a Banbury mixer, or, indeed, other machines: so that part of the visit was perhaps more interesting than useful, save to give us a concept of the magnitude of the operations as a whole and the machines in particular. We were, however, grateful for the arrangements made to put us in the same position as regards evidence as the trial judge.

### (3) MAKING A COMPOUND FOR TYRE TREADS

#### (a) PROCESSES

For the purposes of the present case the processes that produce the compounds for tyre treads can be divided into three stages:—

- (i) the formation of a latex;
- (ii) turning the latex into a solid bale; and
- (iii) processing the bale into a compound.

Thereafter there follow processes which constitute a separate stage in the production of the finished article—the tyre—viz.:—

- (iv) manufacturing the tyre tread from the compound.

Of these four stages, the first two are carried out at the factory of a company such as I.S.R. devoted to producing synthetic rubber, whilst the next two take place at a tyre manufacturing factory such as that at Brentford.

\* [1971] R.P.C. at 221 and 227.



It is sufficient, at this juncture, to give a compact outline of each of the above stages without embarking on technical detail. In relation to each, however, it is necessary to note at the outset that one important property of any rubber or compound therefrom is its viscosity or toughness; that this property is measured in the United States and this country by a Mooney Viscometer (also referred to as a Plastometer); that it is expressed in terms of Mooney as thereon read; that the normal reading referred to for industrial purposes is that taken at the end of a four minute test; and that the higher the Mooney the tougher the rubber or compound. For the way in which a Viscometer works, see the judgment at page 281, where the German standard DEFO method of measuring viscosity is also mentioned.

*Stage (i)*

The first of the four stages consists of the polymerisation of raw materials known as monomers (derived from petroleum). The process used is an emulsion process by which the monomers are emulsified in water in the presence of soapy materials. In the result the molecules of the monomers are strung together to form long chains giving a product of high molecular weight known as a polymer. At this stage of the mixing, which takes place in large vats or containers, another chemical, called a modifier, can be added both to limit the length of the molecular chains, and thus the molecular weight of the rubber, and also to minimise that branching of chains and formation of cross links between them, which results in what is known as “gel”. At the end of this process there is produced a liquid called latex.

*Stage (ii)*

(a) The latex is then coagulated and takes the form of “crumb”, which in the example before us had a somewhat cauliflower-like appearance. It is necessary to distinguish between “crumb” at this stage and the substance produced at Stage (iii) by breaking down solid rubber—for convenience the former can, if necessary, be referred to as “original crumb” and the latter as “Banbury crumb”. The original crumb, as coagulated from the latex, is then compressed and forms a bale which is available for delivery to a tyre manufacturing factory. As thus compressed it is industrially known as polymer, and is given a number by which it can be identified and bought. Its Mooney at this stage is referred to as its “raw Mooney” and, of course, depends on the chemical processes with which Stage (i) is concerned.

(The general nature of the processes of Stage (i) and Stage (ii)(a) is shown on illustration (A) appended to this judgment.)

(b) Before the latex is coagulated there can be introduced additives. These include such things as anti-oxidants, but from the point of view of this case the important additives are carbon black and oil. Carbon black (a reinforcing filler) is introduced to improve properties of the product, notably abrasion resistance. The introduction for softening purposes of high percentages of oil to a degree previously without practical precedent is one of the major integers in the patent-in-suit and has given to the product the name “oil-extended rubber”. (This oil can also be introduced at Stage (iii)). After these additives have been introduced the latex is then coagulated and compressed into bales as in (a) above.

When a latex is thus combined with carbon it is often referred to as a carbon masterbatch: when combined with oil as an oil masterbatch. The Mooney of such a masterbatch bale is also referred to as a “raw Mooney”, though it might more properly be referred to as a “compound Mooney”, as it is really the Mooney of a compound.

Bales of such masterbatch material are also industrially marketed as polymers with specified numbers (e.g. 1712).

*Stage (iii)*

At this stage the polymer as received at the tyre factory goes through a series of processes designed to produce a compound suitable for the making of tyre treads at Stage (iv). To enable it to be successfully used at the latter stage, one of the essential properties of the compound must be that it is sufficiently soft, having a viscosity in the region, according to the patent-in-suit, of between 40 and 80 Mooney. 5

If the polymer as received in bale form is very tough it must accordingly be softened. Before the date of the patent-in-suit there were two methods which were industrially regarded as being available and practicable. One was mastication (grinding or kneading), which could be effected mechanically in mills having two rollers producing intense mechanical working at the nip, or by using a Banbury mixer. The other was by applying heat in a way known as the Hagen process, to which further reference will be made. 10 15

But irrespective of whether the polymer reaching a tyre factory was already sufficiently soft, or whether it was softened by mastication or by the heat process, it was an essential part of Stage (iii) that the polymer should be mixed in a Banbury mixer with other materials, such as reinforcing fillers (e.g. carbon black), anti-oxidants, vulcanising agents (e.g. sulphur), accelerators, and softeners (plasticisers) used assist incorporation of fillers. This mixing might be done, as indeed was common practice, by two steps, a Banbury mixer being used for each. 20

In view of the importance of the operation of the Banbury mixer, there has been appended to this judgment Illustration (B), taken from G.11, 11, 162. This illustration is referred to in the trial judgment [1970] F.S.R. at page 276,\* where the mixer is also described and where reference is made to its size and to the fact that it requires considerable horse-power for its operation. 25

From a practical point of view the making of a compound depended on the success of these mixings, and success or failure stemmed from the correct combination of a number of factors, such as the temperature of the Banbury mixer at the commencement of any mixing, the proportions of the materials added, the timing of the additions, the order in which they were added, the period of time over which the mixing took place, and so forth. Schedules were prepared in advance of any mixing showing exactly how the operation was to take place in relation to each of the above integers. 30

Before November 1950, such oil softener as was added was limited to 10 or 15% of the weight of the rubber for reasons which will be mentioned later. 35

At such time as might be directed by the schedule, the mixture was dropped out of the Banbury, emerging as a cohesive and dough-like mass. After the final mixing (if there were more than one) or after the single mixing (if there was only one) the compound, in its final form, was thus dropped on to a mill by which it was rapidly pressed into sheets: these were then stored and became available for processing at Stage (iv). 40

*Stage (iv)*

The processes by which a tyre is manufactured from the compound are in part hand operations and in part the operations of ingenious and complex machinery. These processes can best be understood upon seeing the films to which reference has already been made. For the purposes of this judgment, however, it is sufficient to mention two 45

\* [1971] R.P.C. at 216.

important operations—one is the extrusion of the compound through an extruder, described in the judgment [1970] F.S.R. at 276;\* the other is the vulcanisation which takes place later in sequence.

(b) REQUISITES OF A COMPOUND AND OF THE PROCESSES  
FOR MAKING IT

5 The viscosity (toughness) of a polymer and any compound based on it is only one of the processing characteristics to which regard must be had at all stages. Thus the compound must be capable of being processed on the existing machinery, which is large and costly—and that includes being capable of being extruded and vulcanised  
10 satisfactorily at Stage (iv): it must be of appropriate elasticity and tackiness: it must have in it a correct quantity of carbon black, which needs to be adequate and uniformly dispersed. Such is the cost of the massive machinery at a tyre factory and of the power and labour required for its use that considerable importance is attached to economy in time of processing, and even a few minutes saving in, for instance, milling  
15 or Banbury mixing is of account.

In addition there must be kept in mind the qualities required of the end product—the tyre tread. These include treadwear (abrasion resistance), avoidance of hysteresis (heat generation), resistance to flex cracking, interply adhesion after vulcanisation, hardness and resistance to cuts, and frictional or anti-skid properties. In the aggregate  
20 these qualities were referred to in the evidence as constituting “the dollar value of the tyre”.

Some of the above characteristics and qualities of course overlap: more important, they all tend to interlock in the sense that if something is done to improve one quality or characteristic it may adversely affect another. For instance, an increase in the  
25 treadwear of a tyre effected by using a harder compound may materially diminish its anti-skid properties. Again, rendering a tough polymer soft enough for processing can, if done by heat, economise in time but result in a decrease of elasticity, with adverse effects on the vulcanisation process.

The patent-in-suit is concerned with the processing of high Mooney synthetic  
30 rubber, i.e., a very tough polymer, the toughness of which stems from long molecular chains created at Stage (i) and from gel formation which can come into being at the same time. Such tough rubber cannot be processed at Stage (iv) without having been softened. Up to the time that the plaintiffs in June, 1951, publicised the process which is the subject of the patent-in-suit, that softening was effected either by mastication or  
35 by heat. But while a processible compound was thus produced, both methods of softening resulted in degradation (deterioration) of the resulting compound through the breaking of the molecular chains, and as the length of these chains provided valuable properties their breaking adversely affected treadwear and other qualities of the tyres produced from the compound.

40 (4) HISTORY OF PRODUCTION OF SYNTHETIC RUBBER  
AND COMPOUNDS TO 1950

The relevant history on the above subject is helpfully and fully set out with precision in the first instance judgment [1970] F.S.R. at 275 onwards.† It is sufficient at the present stage of this judgment to extract certain salient facts.

\* [1971] R.P.C. at 216.

† [1971] R.P.C. 215 onwards.

In Germany the production of synthetic rubber was both before and during World War II concentrated on polymers given the generic name of BUNA including, from 1935 onwards, BUNA-S. The BUNA polymers had an extremely high molecular weight (200 Mooney and upwards). This weight resulted in part from the length of the molecular chains and in part from gel formation. Such was its toughness that much softening was required to make the product processible as the main constituent of compounds for tyre treads. This softening was originally achieved by mastication (including processing through Banbury machines or their equivalent): from 1938 onwards, however, a heat softening process originated by one Hagen was much used. Both processes were long and accordingly costly, proportionately to the time taken, in occupying expensive equipment, and produced the degradation or deterioration previously mentioned.

In the U.S.A. synthetic rubber was, as from the outbreak of World War II, produced under a scheme largely financed by the Government. The polymer was known as GR-S, and at first was similar to BUNA in composition. In 1941-42, to avoid the necessity for a lengthy heat softening process the production of polymers was turned over to a new process which entailed adding at Stage (i) a modifier (usually Mercaptans) at fairly high temperatures to prevent the formation of unduly long molecular chains. The resulting polymer ("hot rubber") had a low molecular weight and was of about 50-60 Mooney. It did not have the high treadwear property given by compounds using polymers with longer molecular chains.

Then from about 1947 or 1948, by a different process operated at a much lower temperature, "cold rubber" polymers (still known as GR-S) were produced of a similarly low Mooney: these again were better adapted for processing than the original BUNA polymers but still did not have the advantage of the above-mentioned high treadwear property.

For strategic reasons the development and manufacture of synthetic rubber for all purposes was, as between the U.K. and the U.S.A., left during World War II to the latter. Any knowledge or experience of British tyre manufacturers of developments during this period thus became in the main necessarily secondhand.

After that War, as a result of combined intelligence operations in Germany, reports on the methods used there for making rubber and compounds were produced. Most of these were published in the U.S.A. and then made available in the U.K. In the course of submissions to this court particular emphasis was laid on two such U.S.A. reports of August and September 1945 (E.1.(e) and E.1.(f)). Of similar reports first published in this country, the most important was "The Rubber Industry in Germany during the period 1939-1945": it was published in 1948 and is referred to as B.I.O.S. (see Vol. M).

At this point it is convenient to mention the dates of three specifications much relied upon as constituting anticipation. These are hereafter referred to as "Semperit (a)", a Viennese specification dated 17th May, 1943 (E.1.(a)), "Semperit (c)", another Viennese specification, dated 15th January, 1945 (E.1.(c)), and "Wilmington", a U.S.A. specification accepted in 1947 for the purposes of a British patent (E.1.(d)). These specifications will be discussed later in this judgment.

## (5) THE GAP AND THE PROBLEM

As appears from the facts set out in the immediately preceding section, the compounds based on synthetic rubber in industrial use for the manufacture of tyre treads up to 1950 were thus of two types. One was based on a very tough high Mooney (around 200 Mooney or more) polymer that had been degraded—the degradation being either by mastication or thermal treatment: the other was based on a low Mooney (50 to 60) polymer, originally hot and later cold, known as GR-S: the latter is referred to as a “soft rubber”—though somewhat confusingly it was, for certain purposes, regarded at the time as a tough rubber. Neither type had the advantage of all those properties which are inherent in undegraded tough rubber of high molecular weight, and the former required long and thus relatively costly processing.

It is also to be observed that tyre tread compounds were thus up to 1950 based on polymers of about 200 Mooney or polymers of around 50 or 60 Mooney. The evidence, indeed, shows that up to that date polymers around 90 Mooney were not used industrially as a base for tyre tread compounds: nor, indeed, have they been since.

The plaintiffs in their specification propounded the existence in 1950 of a gap in industrial knowledge which was in the first instance judgment, [1970] F.S.R. at 284,\* stated in the following terms:

“It was realised that if one could process tough rubbers in such a way as to retain their long molecules and therefore their high abrasion resistance after manufacture, a very good tyre could be produced, but the difficulty apparently was that no one realised how to do it”.

The existence in 1950 of that gap was challenged in this court. However, in a well-known publication of Firestone (U.S.A.), the parent company of the first defendants, called “Synthetic Rubber Facts” (Vol. N, page 7), it has, since the date of the patent, been stated:

“It had been known for some time that high Mooney polymer had superior treadwear resistance, but this property could not be exploited because of the difficulty of processing the polymer”.

Moreover, in an internal memorandum (dated 17th January 1951—G.5, 5,071), the Manager of the Research Division of Goodyear, a rival company to the plaintiffs in the U.S.A., also refers to this gap. (That memorandum deals with the researches set in train by the 21st November 1950 (G.10, 10,026) memorandum from the U.S. Office of Rubber Reserve after the plaintiffs had, on 7th November 1950, written (G.5, 5,067) to the latter saying they had made an important discovery—the “22 per cent. more rubber” letter to which further reference will be made.) The Goodyear “Story of the Tire” (G.11, p. 11,248B) contains this passage:

“The rubber chemist had long believed that tough rubbers possess higher quality than the softer rubber ordinarily used, but there was no feasible way to employ them, because of processing difficulties with conventional rubber factory production equipment”.

On that footing the 1950 problem was as to how to process tough polymers in the requisite way so as to provide results which were commercially useful and at the same

\* [1971] R.P.C. at 222.

time economically viable, for which purpose the polymers would have to have the least practicable degree of degradation.

From the evidence taken as a whole—including the two extracts cited—it is manifest that, industrially speaking, a gap as defined by the trial judge existed in 1950 and that it produced the above related problem. It is no less clear that the process set out in the patent-in-suit provided the answer to the problem. Further it is plain, as, indeed, is conceded by the appellants, that immediately after June 1951, (when the plaintiffs publicised it in an issue of “India Rubber World”—G.6, 6,060) that process commenced to be adopted by the tyre manufacturing industry and that in due course it achieved the great commercial success already mentioned.

To these matters further reference will be made later in this judgment.

#### (6) THE ISSUES BEFORE THIS COURT

In the course of his twelve day opening address, leading counsel for the appellants strongly attacked the first instance judgment as a whole. Indeed, apart from some of the introductory pages ([1970] F.S.R. 270 to 274),\* and the bulk of the section headed “Historical and Technical Matters” (pages 274 to 282),† there was hardly a paragraph that contained any material finding of fact or which set out the trial judge’s approach to those findings which was not subject to stringent criticism.

The salient theme of the submissions was that the trial judge was “so blinded” (to cite a much stressed phrase) by the commercial success of the relevant process that not only did he take this success into account in matters on which it had no bearing but that he also became so unbalanced in his general approach that he adopted evidence given by the plaintiffs’ witnesses whilst ignoring that given on behalf of the defendants; and became “determined to find for the patent”. Moreover, more than once Mr. Templeman challenged the accuracy of certain facts treated in the judgment not only as being correct but as being common ground: for instance, Mr. Templeman declined, at one stage, to accept that a degradation of high Mooney rubber was in substance avoided in the oil-extended processes. Nonetheless, it later emerged that these facts were common ground as between the experts called on both sides and had, indeed, been put forward as such at first instance by counsel for the defendants when cross-examining at first instance.

However, in the end, though the strong overall criticisms were maintained, the issues for this court crystallised and in some respects became even more narrowly defined than at first instance. These issues will be discussed in detail later in this judgment, but it is convenient, at this stage, to summarise them.

##### (i) *Anticipation (Section 32(1) head (e)):*

Under this head reliance was placed by the appellants on *Semperit (a)*, *Semperit (c)* and *Wilmington*—and, to a limited extent, on the March 1950 article referred to as *McMillan II*. On this head no arguments were adduced to us based on any other of the documents referred to in the pleadings or in the judgment.

\* [1971] R.P.C. 211 to 214.

† [1971] R.P.C. 214 to 221.

(ii) *Obviousness (Section 32(1) head (f))*:

Under this head the questions raised (assuming no anticipation) included whether there was any inventive step in the process; how obviousness should be assessed; and whether and to what extent the commercial success of the process should in this case  
5 be taken into account. It was pressed for the appellants that the process was not an invention but either an application of what was already known or a discovery that the results of a known process were wider and better than had previously been realised; that rival companies arrived at the same solution shortly after the plaintiffs; and that the commercial success was due to other factors (e.g., the advent of cold rubber and  
10 of a special carbon black (H.A.F.)), and to the needs resulting from the Korean War, rather than anything that the plaintiffs had done.

(iii) *Insufficient definition (ambiguity) (Section 32(1) head (i))*:

Under this head the appellants concentrated on the difficulties that could ensue from the use of computed Mooney (a method of measuring resistance to shear devised  
15 by the plaintiffs for the purpose of the patent-in-suit) by anyone who wished to know whether he was about to infringe the patent. Under this head he did not in substance rely on the other suggested ambiguities with which the judgment dealt.

It was conceded that the arguments relating to computed Mooney could not prevail against claim 30 or against certain claims related thereto if the appellants did not  
20 succeed on anticipation or obviousness.

It is to be noted that no submissions were made to us in support of allegations on the record that there had been false suggestions in the specification relevant to head (j) or any other head. Nor were there any submissions made in support of allegations of lack of utility.

25 Underlying all the arguments there was a basic dispute as to the ambit of the process for which the monopoly was claimed. The appellants reiterated as their version of the subject matter of the claim the following definition "To make a tyre tread from tough synthetic rubber, soften with oil instead of mastication". "That is the improved process of manufacture", ran the submission—and "such softening was not invented  
30 by the plaintiffs".

For the plaintiffs it was pressed that this definition propounded by Mr. Templeman was inaccurate and incomplete, and that if the specification had disclosed nothing more no manufacturer would have been any further forward. It was their case that the process for which protection was claimed was a new combination of integers: that  
35 these included getting oil into the rubber before the long molecules were broken: that the method of manufacture, taken as a whole, was one that had not hitherto been used and which surprised all concerned by its success: and that the history of the matter as a whole showed that the process was far from obvious on 20th November 1950.

40 As regards the law applicable to the relevant issues, Mr. Templeman urged that, in general, there were no material differences between the appellants and the respondents; nor, indeed, did he, in substance, quarrel with the law as stated in the first instance judgment. It was with the application of the law to the facts in the instant case that he took issue.

45 Accordingly, we do not propose to discuss many authorities in detail despite the fact that we were referred in all to the decisions in some 49 cases—in addition to

textbooks. The fact that so high a proportion of patent cases are reported has unfortunately led to mass citation—with the need often to examine in detail highly technical facts in order to discover the significance of relatively short passages in judgments which, upon such examination, are found to deal with situations quite different to those we had under consideration. As was appositely said by Diplock, L.J. in the *Johns-Manville* case [1967] R.P.C. 479 at 493–4):

“Patent law can too easily be bedevilled by linguistics, and the citation of a plethora of cases about other inventions of different kinds”.

Only a minority of the cases cited to us provided real assistance.

As regards specifications that admittedly form no part of the common general knowledge of a skilled addressee, there was, however, much argument as to whether, and to what extent, they should nonetheless be taken into account on the issue of obviousness. To this further reference will be made later in our judgment.

#### (7) THE ONUS ON THE APPELLANTS

It was common ground that when the validity of a patent is attacked under the relevant provisions of section 32(1) of the 1949 Act, the onus of proof lies, as regards each allegation, on the party launching the attack. There was, however, some discussion as to the position of this court in relation to findings of fact made by the trial judge. We were helpfully referred to that part of the history of patent law which shows the extent to which the Patents Act, 1949, stems from the common law upon which so many important decisions were exclusively founded. In particular, there was emphasised the extent to which questions of fact were for a long time left to a jury and how this aspect of the application of patent law had developed up to the time a specialist patent judge was first appointed in January 1950 and remained relevant.

It is true that in the present case there is the unusual feature that the trial judge did not see and hear the witnesses and is accordingly, to that extent, in no better position than this court: it is also trite to observe that the purpose of this court includes the correction of errors in findings both of primary fact and of the inferences to be drawn from those facts. On the other hand, the weight to be given to the findings of a judge with special experience in assessing scientific and technical backgrounds has more than once been specifically recognised, and we would naturally hesitate before differing from such a judge on questions the resolution of which was materially assisted by that experience.

#### (8) DATES OF IMPORTANCE

Before examining the relevant issues seriatim it is convenient at this stage to list in tabular form the sequence in which occurred some of the salient events—including the writing or publication of documents—which were much relied upon by one or other of the parties. These dates, to some of which reference has already been made, cover both the period before the date of the patent-in-suit and also the period thereafter during which rival companies in the U.S.A. claimed themselves to have made the discovery or invention which is the subject of the relevant patent.



[No. 17]	Court of Appeal	Common general knowledge
1938 1941/2	German publication of Hagen's heat softening process. Production of low Mooney <i>hot</i> rubber (GR-S) commences in U.S.A.	
5 1943 17 May	Semperit (a) specification.	E.1(a)
1944	Rubber Age publicises HAF (carbon black)	G.10, 10,221
1945 15 Jan.	Semperit (c).	E.1(c)
„ Aug.	Rubber Age: Report on German Synthetic Tyres (U.S.A.).	E.1(e)
10 1947 9 Apr.	Wilmington Specification (U.K. Acceptance date).	E.1(d)
„ 23 June	Memorandum of Mr. Woerner of U.S. Office of Rubber Reserve.	G.11, 11,102
„ Aug.	McMillan I (Rubber Age) (U.S.A.)	E.1(g)
15 1947/8	Production of low Mooney <i>cold</i> rubber (GR-S) commences.	
1948	B.I.O.S. Report (U.K.).	M.
1949 Jan.	Dr. Dinsmore's first lecture.	G.11, 11,150
„ 15 Aug.	General Tire Co. first series of experiments and tests.	
20 1950 Feb.	General Tire Co. second series of experiments and tests.	
„ Mar.	McMillan II (Rubber Age) (U.S.A.)	E.1(k)
„ June	Korean War commences.	
„ 7 Nov.	Plaintiffs' letter to U.S. Office Rubber Reserve relating to discovery of an unspecified process (later disclosed in the patent-in-suit) headed "22% More Rubber Now".	G.5, 5,067
25 „ 20 Nov.	Patent specification in suit: application in U.S.A.	
„ 21 Nov.	Memorandum of Mr. Greer (Head of Research Dept. of Office of Rubber Reserve) on the "22% More Rubber Now" letter.	G.10, 10,026
30 1950 30 Nov. } to 1951 25 Jan. }	Various internal memoranda of Office of Rubber Reserve.	
35 1951 31 Jan.	Goodyear Co.'s test programme.	G.10, 10,055
„ 6 Apr.	Phillips Co.'s specification claiming similar invention.	G.11, 11,260
„ June	Publication (Mr. Swart's article in <i>India Rubber World</i> ) disclosing on behalf of the Plaintiffs the process of the patent-in-suit.	G.6, 6,060
40 1952 May	Dr. Dinsmore's second lecture.	G.5, 5,015-57
„ Dec.	India Rubber Journal.	G.5, 5,058
45	Firestone's book "Synthetic Rubber Facts" is published in textbook form and brought up to date from time to time. The volume before this court (Vol. N) bears the date 1958.	

## (9) A. COMMON GENERAL KNOWLEDGE

For construing the patent in suit and again for reaching a conclusion, if there was no anticipation, on the issue of obviousness, it is necessary for us to put ourselves into the position of a skilled addressee at the time the specification was published on 20th

November, 1950. For it is to a skilled addressee—a skilled man reasonably well versed in the art—that the specification is deemed to be addressed, and it is by the standards of the *common general* knowledge of such a man that one tests whether the invention was obvious or not.

In the instant case it is common ground that the skilled addressee is in effect a composite entity—a typical chief compounder and a typical scientific adviser as found in the organisation of any company manufacturing tyres on a large scale. The trial judge (see [1970] F.S.R. at 296)\* remarked of one of the plaintiffs' principal witnesses: "Mr. Baker, a highly skilled chief compounder, is to my mind, if one is compelled to take a single person as the test, the nearest one can get to the ideal 'expert in the art' ". Mr. Baker held the Degree of Bachelor of Science (Chemistry); he had in 1943 been in charge of development compounding for all tyres for all the plants of Firestone (the parent company of the first defendants); and the highest criticism on his evidence ventured by Mr. Templeman was that he was an enthusiast for the new process. We accordingly consider that the above remark was correct and that his evidence was rightly given much weight by the trial judge who nonetheless equally properly put together the knowledge of a chief compounder and a rubber technologist when considering that of the relevant addressee in November 1950. It is obviously a difficult task for us to put ourselves in such a position as at a date some 20 years ago: and it is an essential preliminary to consider what material must be deemed to be within his knowledge.

The *common general* knowledge imputed to such an addressee must, of course, be carefully distinguished from what in patent law is regarded as *public* knowledge. This distinction is well explained in *Halsbury's Laws of England*, Vol. 29, para. 63. As regards patent specifications it is the somewhat artificial (see per Lord Reid in the *Technograph* case [1971] F.S.R. 188 at 193) concept of patent law that each and every specification, of the last 50 years, however unlikely to be looked at and in whatever language written, is part of the relevant *public* knowledge if it is resting anywhere in the shelves of the Patent Office. On the other hand, *common general* knowledge is a different concept derived from a commonsense approach to the practical question of what would in fact be known to an appropriately skilled addressee—the sort of man, good at his job, that could be found in real life.

The two classes of documents which call for consideration in relation to *common general* knowledge in the instant case were individual patent specifications and "widely read publications".

As to the former, it is clear that individual patent specifications and their contents do not normally form part of the relevant *common general* knowledge, though there may be specifications which are so well known amongst those versed in the art that upon evidence of that state of affairs they form part of such knowledge, and also there may occasionally be particular industries (such as that of colour photography) in which the evidence may show that all specifications form part of the relevant knowledge.

As regards scientific papers generally, it was said by Luxmoore, J. in *British Acoustic Films* (53 R.P.C., 221, at 250):

"In my judgment it is not sufficient to prove common general knowledge that a particular disclosure is made in an article, or series of articles, in a scientific

\* [1971] R.P.C. at 232.

journal, no matter how wide the circulation of that journal may be, in the absence of any evidence that the disclosure is accepted generally by those who are engaged in the art to which the disclosure relates. A piece of particular knowledge as disclosed in a scientific paper does not become common general knowledge merely because it is widely read, and still less because it is widely  
5 circulated. Such a piece of knowledge only becomes general knowledge when it is generally known and accepted without question by the bulk of those who are engaged in the particular art; in other words, when it becomes part of their common stock of knowledge relating to the art.”

10 And a little later, distinguishing between what has been written and what has been used, he said:

“It is certainly difficult to appreciate how the use of something which has in fact never been used in a particular art can ever be held to be common general knowledge in the art.”

15 Those passages have often been quoted, and there has not been cited to us any case in which they have been criticised. We accept them as correctly stating in general the law on this point, though reserving for further consideration whether the words “accepted without question” may not be putting the position rather high: for the purposes of this case we are disposed, without wishing to put forward any full  
20 definition, to substitute the words “generally regarded as a good basis for further action”.

At one stage we understood Mr. Templeman to be seeking to persuade us that the contents of the *Semperit* and *Wilmington* specifications were to be taken into account as part of the *common general* knowledge in this country. In his closing address,  
25 however, he rightly conceded they were not. But as it will be necessary to consider whether and to what extent their contents ought to be taken into account on the issue of obviousness, it is convenient at this stage to refer to their physical location.

The *Semperit* specifications themselves were (see D.1, 120) at the material time two of 146,000 microfilm reproductions in cardboard boxes in the basement of the Patent  
30 Office. Their existence in this form had been notified by advertisements in *The Official Journal* (Patents), October and November 1948.

By 1st November 1948, they had become available to the public in the shape of contact prints for which there existed a microfilm reader. The mass of prints had been divided into 89 classes, of which No. 39 (G.8, 8,211) was “horn, ivory and other  
35 carving material, caoutchouc, guttapercha and other plastics”. Abridgements in German of the *Semperit* specifications were printed on pages 364 and 366 of Book No. 8 of Volume 3: they were each of less than 5 short lines (p. 8,220, translations on p. 8,217). The chances of these *Semperit* specifications being found on a search, being recognised as relevant, and being regarded as useful, are discussed later in this  
40 judgment in relation to the plea of obviousness. Suffice it for the moment to say that they provide an apt illustration of the distinction between *public* knowledge and *common general* knowledge—and the highly artificial nature of the concept of the former.

The *Wilmington* specification was available in the usual way amongst U.K. speci-  
45 fications at the Patent Office: from the date of the application, 2nd August 1944, it ranked, of course, as *public* knowledge, but there is no evidence to show that there was

any user of it either by the Wilmington Corporation (a well-known firm of tyre manufacturers) before they failed and went into liquidation or by any other manufacturer. It is to be noted that this specification formed one plank of an attack made on the patent-in-suit in the course of opposition under section 14 by the Polymer Corporation of Canada. Those opposition proceedings commenced at the later end of 1955, were prolonged, and after coming before the Comptroller and then, on appeal, before the Patents Appeal Tribunal (Lloyd-Jacob, J.), ended in November 1962, when the opposition failed upon the patent-in-suit being amended. (This decision of Lloyd-Jacob, J. constitutes no estoppel and has not been cited to us.)

As regards scientific papers, the plaintiffs put before the trial judge a list of what they described as "Widely read publications" (see [1970] F.S.R. at 312-B)\* and referred him to their contents. We understand that he accepted that the above description was correct: and there having been no challenge here to that acceptance we, too, have accordingly taken it to be accurate.

As a number of the books and documents in the list were published in the U.S.A., it is as well to record that for the purposes of this case the plaintiffs conceded that, because of the close relations between the tyre manufacturers of the two countries, they were to be taken into account when assessing *common general* knowledge in this country in the same way as if first published here. (There was, of course, rightly no such concession in relation to internal memoranda of United States Corporations or of the U.S. Office of Rubber Reserve or as to correspondence between them—the contents of which, however, provided useful evidence on other issues.)

As will appear later in this judgment, we have found some of the material in those widely read publications to be of considerable value in throwing light on the state of *common general* knowledge in this country immediately before 21st November, 1950—both as itself constituting evidence and also as corroboration of oral testimony on this important question, not least when there was some conflict between witnesses. When taking this material into account we have looked at it as a whole to ascertain its general tenor rather than selecting from particular documents specific extracts which, read in isolation, might favour one side or the other: our approach being the same as that adopted by the trial judge. In this way there can be ascertained not only the *common general* knowledge as to what—taking a practical and commercial point of view—was being done and what could be done, but also as to what on then current knowledge was not being done and from the same point of view was not regarded as being commercially practicable.

Throughout, when coming to our conclusions on this important matter, we have of course kept in mind that the state of *common general* knowledge at any specified date is a question of fact to be decided upon evidence, and that it is for those who attack a patent to establish such knowledge as they may seek to rely upon.

## B. ANTICIPATION

### (1) *General*

The word "Anticipation" is not used in the text of the Patents Act, 1949, although it appears in the side notes to sections 7 and 8 of the Act. The language of section 32(1)(e), with which we are concerned on this aspect of this case, is as follows:

\* [1971] R.P.C. at 245.

“That the invention, so far as claimed in any claim of the complete specification, is not new having regard to what was known or used, before the priority date of the claim, in the United Kingdom.”

5 Stated in the shortest terms, the problem is to determine whether the device, to use a neutral expression, has been forestalled in this country. For the sake of clarity we will refer to the patentee or would-be patentee of the device which is alleged to have been anticipated as the “patentee” and to the inventor of the device which is alleged to constitute anticipation as the “prior inventor”.

10 In the present case we are not concerned with anticipation by earlier use of the patentee’s device but with anticipation by prior publication: that is to say, it is contended that the plaintiffs’ invention as claimed in their patent was at the priority date of their claim something which was known in the United Kingdom by reason of prior publications. To determine whether a patentee’s claim has been anticipated by an earlier publication it is necessary to compare the earlier publication with the patentee’s claim. The earlier publication must, for this purpose, be interpreted as at the date of its publication, having regard to the relevant surrounding circumstances which then existed, and without regard to subsequent events. The patentee’s claim must similarly be construed as at its own date of publication having regard to the relevant surrounding circumstances then existing. If the earlier publication, so construed, discloses the same device as the device which the patentee by his claim, so construed, asserts that he has invented, the patentee’s claim has been anticipated, but not otherwise. In such circumstances the patentee is not the true and first inventor of the device and his claimed invention is not new within the terms of section 32(1)(e).

25 The earlier publication and the patentee’s claim must each be construed as they would be at the respective relevant dates by a reader skilled in the art to which they relate having regard to the state of knowledge in such art at the relevant date. The construction of these documents is a function of the court, being a matter of law, but, since documents of this nature are almost certain to contain technical material, the court must, by evidence, be put in the position of a person of the kind to whom the document is addressed, that is to say, a person skilled in the relevant art at the relevant date. If the art is one having a highly developed technology, the notional skilled reader to whom the document is addressed may not be a single person but a team, whose combined skills would normally be employed in that art in interpreting and carrying into effect instructions such as those which are contained in the document to be construed. We have already described the composite entity deemed to constitute the notional skilled addressee.

40 When the prior inventor’s publication and the patentee’s claim have respectively been construed by the court in the light of all properly admissible evidence as to technical matters, the meaning of words and expressions used in the art and so forth, the question whether the patentee’s claim is new for the purposes of section 32(1)(e) falls to be decided as a question of fact. If the prior inventor’s publication contains a clear description of, or clear instructions to do or make, something that would infringe the patentee’s claim if carried out after the grant of the patentee’s patent, the patentee’s claim will have been shown to lack the necessary novelty, that is to say, it will have been anticipated. The prior inventor, however, and the patentee may have approached the same device from different starting points and may for this reason, or it may be for other reasons, have so described their devices that it cannot be immediately discerned from a reading of the language which they have respectively used that they have discovered in truth the same device; but if carrying out the

directions contained in the prior inventor's publication will inevitably result in something being made or done which, if the patentee's patent were valid, would constitute an infringement of the patentee's claim, this circumstance demonstrates that the patentee's claim has in fact been anticipated.

If, on the other hand, the prior publication contains a direction which is capable of being carried out in a manner which would infringe the patentee's claim, but would be at least as likely to be carried out in a way which would not do so, the patentee's claim will not have been anticipated, although it may fail on the ground of obviousness. To anticipate the patentee's claim the prior publication must contain clear and unmistakable directions to do what the patentee claims to have invented: *Flour Oxidizing Co. Ltd. v. Carr & Co. Ltd.* ((1908) 25 R.P.C. 428 at 457, line 34, approved in *B.T.H. Co. Ltd. v. Metropolitan Vickers Electrical Co. Ltd.* (1928) 45 R.P.C. 1 at 24, line 1). A signpost, however clear, upon the road to the patentee's invention will not suffice. The prior inventor must be clearly shown to have planted his flag at the precise destination before the patentee.

The earlier publications upon which the appellants relied in this case as anticipations of the plaintiffs' patent were, as already indicated:

- (1) a Viennese patent dated 17th May 1943: E.1.(a)—“Semperit (a)”,
- (2) a Viennese patent dated 15th January 1945: E.1.(c)—“Semperit (c)”,
- (3) an English patent the priority date of which is 2nd August 1944, published in the United Kingdom in April 1947, on communication from Wilmington Chemical Corporation of Delaware, U.S.A.: E.1.(e)—“Wilmington”.

Some reference was also made to two articles by F. M. McMillan and others, referred to as McMillan I and McMillan II published in “Rubber Age” in August 1947, (E.1.(g)) and March 1950, (E.1.(k)) respectively. Each of these documents must be considered separately. For this purpose it is not permissible to combine earlier unconnected publications to show anticipation, for, if combination of earlier unconnected publications is necessary to assemble all the elements of the invention said to have been anticipated, it follows that no one man has previously made that invention and that the combination is novel.

It is common ground that Semperit (a), Semperit (c) and Wilmington were all documents which for the present purpose must be taken to have been published in the United Kingdom before the priority date of the plaintiffs' patent. It should be emphasised that it is the invention so far as claimed in any claim of the patentee's complete specification that must be shown to have been anticipated. Material contained elsewhere in the complete specification is not relevant except so far as it bears upon the proper interpretation of the claim.

## (2) *The Specification*

The plaintiffs' complete specification relating to the patent in the suit contains 36 claims. The argument has, however, concentrated upon the first of these claims, which is in the following terms:

“1. A method of making a vulcanisable plastic rubber compound suitable for a rubber tyre tread which method comprises the step of mixing a synthetic rubbery polymerisation product, being compatible with hydro-carbon mineral oils, of a conjugated diolefin having not in excess of 8 carbon atoms with at least 20%—based on the weight of the polymerisation product—of a compatible

5 plasticiser, in such a way that the plasticiser is distributed through and uniformly absorbed by the polymerisation product before it has been appreciably deteriorated by mastication, said polymerisation product containing at least 50% by weight of said diolefin and having a 'computed Mooney' plasticity of at least 90 and admixing at least 30 parts of reinforcing pigment per 100 parts of the total weight of polymerisation product and plasticiser, said rubber compound having a Mooney plasticity not in excess of 80 and not substantially less than 40 when measured with a large rotor in a Mooney plastometer at 4 minutes at standard conditions."

10 The learned judge has, in the course of his judgment ([1970] F.S.R. 283-A to the foot of page 291)\*, with admirable clarity analysed and commented on the specification in a way which relieves us of going over much of the same ground a second time. It should be appreciated that, as the specification recites, it had then long been known that tyre treads made from synthetic rubber of a high molecular weight, which had  
15 not been degraded by mastication or thermal treatment, had a much higher abrasion resistance than tyres made from synthetic rubber of high molecular weight which had been subjected to degradation in either of these two then conventional forms. It had also long been recognised, as the specification also recites, that tyre treads made from high molecular weight synthetic rubber, carefully processed and broken down  
20 to only a very limited extent, were superior to tyre treads made from the softer GR-S rubber then commonly in use for the purpose of making tyres. The plaintiffs claim no discovery or invention in these respects. The problem with which they were confronted was that synthetic rubbers of high molecular weight were, as mentioned earlier in our judgment, considered to be incapable of being processed into tyre treads on a  
25 commercial basis: their toughness *inter alia* made it impracticable to extrude the compound at Stage (iv).

At page 3, line 4 of the specification the plaintiffs assert:

30 "We have however found that tough rubbers which were considered unprocessable and not suitable for making extruded tire treads in production may be mixed with relatively large amounts of one or more compatible oils or plasticisers to provide compounds of exceptional quality."

The specification proceeds (at page 3, line 105):

35 "Such compounds containing large amounts of softener have produced tyre treads superior to those produced with the general purpose synthetic rubbers heretofore available and at very much reduced cost. The softener is incorporated, in accordance with the present invention, in the rubber before the rubber is deteriorated by mastication and preferably while the rubber is in a finely divided state such as is present in aqueous dispersions or in a crumb-like state with small particles which may be separated by a pigment such as carbon black. Mastication  
40 in the presence of large amounts of softener added in the stages of the mastication procedure prevent the breakdown of the rubber such as is had by the usual masticating procedures."

There then follows a discussion of the theories put forward by the plaintiffs as to the procedure which they recommend should produce these results. These theories are  
45 irrelevant to the question of anticipation, but the language in which they are expressed makes it clear and emphasises that the plaintiffs' invention relates to the processing of high Mooney polymers.

\* [1971] R.P.C. 221, line 35, to 228, line 32.

At page 4, line 91 onwards, the specification indicates that in order to obtain maximum advantage from such high Mooney polymers these should be combined with oil when in a finely divided state. If the polymer is obtained in the form of a large mass, such as a bale, this should be pulverised or granulated to a powdery or crumb-like state before being brought into contact with the oil. This, it is stated, can be achieved by breaking up the bale in a Banbury mixer, a process which will usually result in the rubber forming a pulverulent mass because of its lack of plasticity. This state we have referred to as "Banbury crumb". If this does not occur, the process can be assisted by the addition of small amounts of carbon black or other pigment to the polymer before plasticisation has occurred so that the rubber particles are insulated from each other and prevented from being packed together as they are formed in the mixing apparatus. When the polymer is in a finely divided state, it is, so the specification states, rapidly swelled by the oil without deterioration and the rubber particles thereafter readily agglomerate to form a plastic mass. The specification goes on (at page 5, line 17) to describe an alternative method of introducing the oil to the polymer whilst still in latex form and then coagulating the mixture so arrived at.

The specification explains (at page 5, line 49) that the proper characterisation of a polymer may not always be discoverable by means of a Mooney measurement carried out on the raw polymer. If the polymer would have a reading in excess of about 120 Mooney, the Mooney viscometer would be unlikely to record an accurate reading on account of the fact that the rotor of the viscometer would be likely to slip against the surface of the sample under test or tear it. Moreover, if the polymer is one containing gel, so that there are what might be described as granules of tougher material embedded in softer polymer, the viscometer may again give a misleading reading.

To meet this problem the plaintiffs devised a method, based on certain experiments of theirs, for computing the Mooney rating of a given polymer in its original state, before the admixture of any oil or other additive, by means of a calculation based upon the actual Mooney rating of a compound of that polymer with a certain quantity of oil. The specification uses the designation "Computed Mooney" to indicate the notional Mooney rating of the original polymer computed by this method. This subject is dealt with in the specification at page 5, line 49, to page 6, line 44, and is relevant to the question of insufficient definition. We shall have to revert to it later in that context, but we do not need to enter into more detail at the present stage.

At page 6, lines 61 to 67, the specification deals with the manner recommended by the plaintiffs for reducing tough polymer which is in a solid form (e.g., a bale) to crumbs. This seems to have been novel, but it forms no part of the invention as claimed. It is, however, significant that it is asserted that the fine crumbs to which the mass is so reduced will not work into a cohesive mass—i.e., a dough-like mass appropriate for mastication.

The specification directs that the oil should be added in one or two increments and worked for up to four to six minutes, and should preferably be absorbed before any carbon black is added. It is stressed that the total mixing time for both oil and carbon black should only be that required to obtain a cohesive mass.

The next paragraph of the specification deals with the amount of oil appropriate to be added to polymers of varying Mooney ratings in order to obtain a processible



compound. In order to be capable of being extruded in the course of the manufacture of tyre treads the Mooney rating of the compound should be between 40 and 80 Mooney and preferably round about 60 Mooney. The specification asserts that if the computed Mooney of the polymer is 90, about 30 parts of oil are usually required  
 5 for each 100 parts of polymer to obtain a 60 Mooney compound. It states that the benefits of the invention become particularly impressive where the computed Mooney of the polymer is above 115, in which case about 40 parts of oil are required to obtain a 60 Mooney compound using 50 parts of carbon black per 100 parts of rubber. When  
 10 the computed Mooney of the polymer is above 150, the specification says that at least 45 to 50 parts of oil are required to obtain the same processibility and that as much as 75 parts may be used to make tyre treads which are not inferior to those made from standard GR-S rubber such as was then in commercial production. At page 7, line 16, the specification states that benefits are obtained in accordance with the invention when the computed Mooney of the raw polymer is 85 or more (a lower limit than the  
 15 90 Mooney threshold of the claim) and that greater benefits are obtained when it is 100 or more as the amount of oil used to obtain substantially the same properties is considerably increased without disadvantage and greater economies are effected. At line 34 the specification states that the plaintiffs preferredly prepare polymers with Mooney plasticity of 150 or more in order to use large volumes of inexpensive oil  
 20 and obtain the treadwear inherent in these unbroken-down polymers.

At page 7, lines 43 to 103, there is a passage upon which the appellants place considerable reliance because it shows that the invention may be employed when the stock to be compounded consists not merely of high Mooney polymer but of a blend  
 25 of high Mooney and low Mooney polymers. We need not read the passage in extenso. It is sufficient to say that the specification states that the polymer should preferably be homogeneous or, if present in mixture with other polymers such as those of the general purpose type (i.e., GR-S soft rubber) should constitute a major portion or sufficient proportion such that the computed raw Mooney rating of the mixture is at least 85.

30 The specification claims that a number of benefits result from the application of the invention:

- (a) that it results in tyre treads having improved properties combined with lower cost than those theretofore produced (page 1, line 25),
- 35 (b) that the product is less liable to stiffen in the coldest climates and has improved flexibility at low temperatures combined with good abrasion properties (page 1, line 29),
- (c) that it results in the production of tyres having properties superior to those then in production and that this can be achieved by the use of the usual rubber machinery and with the expenditure of less polymer (page 1, line 35),
- 40 (d) that the compounds produced in accordance with the invention are of exceptional quality (page 3, line 9),
- (e) that rubber articles such as tyre treads produced from the compound having large amounts of oil are equal to and in many cases considerably superior in properties to those produced from conventional mixes (page 5, line 11),
- 45 (f) that the invention effects great economies in the amount of synthetic rubber used (page 20, line 36).

At page 20, line 43, the specification expressly excludes polymers of the kind known as nitrile rubbers from the ambit of the specification.

Before we come to consider the ambit of claim 1 of the specification in the light of the material contained in the body of that document we should, at the risk of repetition, at this point again say something about the methods of compounding rubbers which were in commercial use immediately before the priority date of the plaintiffs' patent. By comparing these methods with what is disclosed in the specification it will be possible to make clear in what respects the plaintiffs' invention differed from the then accepted methods of compounding. 5

In this behalf we have already referred with appreciation to the admirably precise survey in the judgment from [1970] F.S.R. page 275-B to page 280-D.\*

Two methods of introducing the fillers, softeners and other additives to the polymer were known, mastication and latex masterbatching. Mastication was carried out either on a mill, a machine resembling a large-scale power-driven domestic mangle, or in an internal mixer, of which the Banbury mixer seems to have been the kind most commonly used. This method of compounding involved kneading the fillers and other additives into the polymer after it had been reduced to a cohesive or dough-like mass. This kneading process is known as "working" the rubber or compound. It is this working process which breaks the molecular chains and degrades the rubber. It was thought, however, that it was impossible properly to distribute the additives through the polymer and to ensure that they were absorbed into it in a satisfactory manner without this working process. The tough synthetic Buna polymers could not satisfactorily be reduced to the necessary dough-like consistency by mastication on account of their toughness. 10 15 20

This problem was met in Germany by the invention of Hagen's thermal process to which we have already referred. In the U.S.A. the problem was met by arresting the polymerisation process by the use of modifiers at a stage before long molecular chains were formed, so that the polymer had a viscosity of not more than about 50 to 60 Mooney. This was the type of synthetic rubber referred to as GR-S. It requires no modification before being subjected to mastication for the purpose of reducing a bale to the necessary dough-like consistency suitable for compounding by the working process. 25 30

In the case of latex masterbatching those additives which it is desired to add to the latex at this stage are added in liquid form to the liquid latex. It was not, however, considered desirable to add large quantities of softener in this way because it was believed this would have adverse effects on the properties of the final product, the tyre tread. Where natural rubber was used, not more than 4 to 5 parts of softener to 100 parts of rubber were used, but in the case of synthetic rubbers on account of their higher molecular weight the proportion of softener was increased to about 10 to 12 parts of softener to 100 parts of rubber. 35

The evidence establishes that, unless such a method is to be found in one of the documents relied on in the present case for anticipation, no known satisfactory method existed before November, 1950, for processing synthetic polymers having a high viscosity without their degradation either by thermal treatment or by mastication, and that in the case of these polymers in their undegraded state mastication was not an easy or particularly satisfactory process. The same problem did not arise in the case of GR-S polymers on account of the fact that the polymerisation process was arrested at a stage when the molecular chains were relatively short, but for the same 40 45

\* [1971] R.P.C. 215, line 32, to 219, line 40.

reason the qualities of GR-S polymers were not superior to the qualities of degraded polymers of a higher initial viscosity.

We return now to claim 1 of the plaintiffs' specification. It relates to a method of making a vulcanisable plastic rubber compound suitable for a rubber tyre tread. This is to be made from a polymer having certain chemical characteristics which we need not here specify or comment on in detail. It is sufficient to say that the butadiene-styrene copolymers which are customarily used for manufacturing tyres and include both the German Buna-S and the U.S.A. GR-S synthetic rubbers, conform to this description. This polymer is to have a computed Mooney of at least 90. This means that it is to be of a considerably higher viscosity than the standard GR-S rubber and that it would not be processible by the conventional method without degradation either by heat or by mastication.

This polymer is to be mixed with a compatible plasticiser, which for present purposes we can take to be an oil, in the proportion of at least 20 parts of oil to 100 parts by weight of the polymer. This, it will be observed, represents an increase of the order of 100% in the amount of softener to be introduced to the compound compared with conventional methods. 20 parts is, moreover, stated as a minimum, and the body of the specification makes it plain that greater quantities of softener may be advantageously employed in appropriate conditions. The mixing of the oil with the polymer is to be carried out in such a way that the oil is distributed through and uniformly absorbed by the polymer before it has been appreciably deteriorated by mastication. The claim does not say how this is to be achieved. The method is left to the choice and ingenuity of the executant, but two methods, mixing the oil with the polymer when it is either in crumb form or in latex form, are recommended and described in the body of the specification. At least 30 parts of reinforcing pigment, which we may take to consist of carbon black, is to be added to every 100 parts by weight of the combined polymer and oil. The resulting compound is to have a viscosity not in excess of 80 Mooney and not substantially less than 40 Mooney when measured with a large rotor in a Mooney viscometer at 4 minutes at standard conditions, that is to say, that it is to be capable of extrusion.

Important elements or integers in this claim for present purposes are:

- (1) that the polymer is to have a computed Mooney of at least 90;
- (2) that at least 20 parts of oil are to be added to the polymer; and
- (3) that this is to be done in such a way that the oil is distributed through and uniformly absorbed by the polymer before the latter has been appreciably deteriorated by mastication.

We have, we hope, made it clear that this combination is inconsistent with the method of compounding which obtained before the priority date of the plaintiffs' patent. Without this combination the benefits claimed by the plaintiffs as achieved by their invention could not be achieved, because (1) unless the polymer employed is one of at least a relatively high Mooney rating, it will not contain the long molecular chains, the benefit of which is intended to be carried through into the final product; (2) the benefit of the presence of those long molecular chains in the polymer will not be preserved in the final product unless appreciable degradation is avoided; and (3) the polymer, being of high viscosity, will not be processible on the kind of machines to be found in tyre factories without its being softened sufficiently to enable it to be extruded, which means that the Mooney value of the compound must be between 80 and 40 when tested as prescribed. This softening is brought about by the addition of a much larger proportion of oil than was theretofore considered appropriate.

**(3) *Semperit (a)***

We will now consider the documents relied on as anticipations. We will first take *Semperit (a)*, which relates to an invention concerned with the production of Buna compounds for vehicle tyres having good thermal properties. The specification points out that tyres made of natural rubber with good thermal properties had theretofore been obtained by substantially increasing the filler content of the tyres, in particular its content of zinc white, but that the Buna compounds rich in zinc white were hard and difficult to process. The specification recommended two methods of overcoming this difficulty, both directed to increasing the proportion of plasticisers and replacing some part of the zinc white filler content by carbon black. The first method recommended is as follows:

“In accordance with the application rubber compounds which are rich in filler and plasticiser substances, but which are nevertheless strong, are obtained in that, besides degraded Buna, simultaneously undegraded Buna is also used, the latter being used in a proportion of about 45% to 55% or even more of the total quantity of Buna. The amounts of plasticisers should amount to about 50% or 60% of the weight of the undegraded Buna; while the filler substances, amounting to 40% to 80% of the total amount of rubber consist to the extent of 30% to 70% of zinc white and/or carbon black. These substances are mixed with the other customary additives in the usual way.”

The second method is described as follows:

“The mixing can also be carried out in such a manner that there is made from undegraded Buna in crumb or ribbon form and of plasticiser or plasticiser mixture in a suitably heated internal mixer a pre-mixture, for example made from 2 parts of Buna and 1 part of plasticiser, this pre-mixture together with the thermally degraded Buna, the carbon black, and the filler substances is worked up in the usual manner in a kneader into a carbon black batch, and is then processed on a roller mill into the final compound.”

The *Semperit (a)* specification claims that compounds made in the manner there described may be used for the production of various parts of tyres, including tyre treads, and that because they contain larger amounts of fillers and plasticisers than before they achieve a saving of Buna, although the resulting compounds are not inferior with regard to their properties and, indeed, are even superior to the compounds theretofore available.

Mr. Templeman for the appellants has placed great reliance upon the pre-mix procedure described in *Semperit (a)*. He points out, as is not disputed, that the claims in the plaintiffs' patent extend to compounds made from blends of high Mooney and low Mooney polymers, so that *Semperit (a)* is not excluded from constituting anticipation on the ground that it relates to compounds made from a blend of undegraded and degraded Buna. He says, further, that the premix method referred to in *Semperit (a)* teaches that a tough polymer can be softened by the introduction of a large quantity of oil to the polymer when it is in a crumb or ribbon form. This, Mr. Templeman contends, is precisely what claim 1 of the plaintiffs' patent claims and all that is claimed there; for, as previously mentioned, Mr. Templeman asserts that the plaintiffs' invention as described in the patent, stripped of its verbiage and reduced to its essentials, is simply this: “To make a tyre tread from tough synthetic rubber, soften with oil instead of by mastication”. In particular he contends that the words “In such a way that the plasticiser is distributed through and uniformly absorbed by the

polymerisation product before it has been appreciably deteriorated by mastication” are mere surplusage in the claim and contribute nothing significant to it. He says that any experienced compounder would wish to avoid any unnecessary degradation and to use his Banbury mixer as economically as possible, and that an experienced  
 5 compounder, told to introduce a large quantity of oil to a high Mooney polymer in crumb or ribbon form, would find by the ordinary processes of trial and error employed in the art of compounding that the oil could be mixed with the polymer without serious degradation of the polymer by mastication.

We feel unable to accept these arguments. *Semperit* (a) contains no instruction that  
 10 the compounder is to mix the oil with the rubber in such a way as to minimise mastication. On the contrary, both passages which we have cited from *Semperit* (a) state in terms that the compounding procedures are to be carried out in the usual way. The inventor of the process described in *Semperit* (a) was not concerned with preserving the molecular structure of the polymer: he was concerned with securing good  
 15 thermal properties in the compound. It is, we think, to be presumed, in the light of the evidence and reading *Semperit* (a), that a compounder seeking to carry out the directions contained in *Semperit* (a) would conduct his compounding operations in the way which was normal both at the date of *Semperit* (a) and at the priority date of the plaintiffs’ patent, that is to say, by mastication.

20 There is, in our judgment, no information to be found in *Semperit* (a) about the method of making a rubber compound set out in claim 1 of the plaintiffs’ patent which for the purposes of practical utility is equal to that contained in claim 1 of the plaintiffs’ patent (see the well-known passage in the judgment of Lord Westbury, Lord Chancellor, in *Hills v. Evans* (1862) 4 De G. F. & J. 288 at 301, which has very  
 25 often been cited and followed, e.g., by Viscount Simonds in *Martin and Biro Swan Ltd. v. H. Millwood Ltd.* [1956] R.P.C. 125 at 133, line 22). *Semperit* (a) does not contain clear instructions to a reader that he should compound in the method set out in claim 1. It is, we think, impossible to reach the conclusion that an experienced compounder who immediately before the priority date of the plaintiffs’ patent sought to  
 30 carry out the instructions contained in *Semperit* (a) would inevitably achieve the result claimed in claim 1 of the plaintiffs’ patent. Accordingly, in our judgment, *Semperit* (a) does not anticipate claim 1 of the plaintiffs’ patent, and in these circumstances it is not suggested that it anticipates any of the other claims contained in that patent.

#### 35 (4) *Semperit* (c)

*Semperit* (c) is concerned with economising in the use of polymer in synthetic rubber compounds by extending the rubber by introducing much larger quantities of softener than had theretofore been customary. This would make it possible also to  
 40 use larger quantities of fillers, further increasing the bulk of the compound obtainable from a given quantity of polymer, “whilst deterioration of the quality of the finished products is counteracted by using a synthetic rubber which is not degraded thermally, mechanically or chemically, e.g. a butadiene-styrene co-polymer, in admixture with thermally degraded synthetic rubber, e.g. with a thermally degraded butadiene-styrene co-polymer”. The specification states: “It is known that synthetic rubber is  
 45 impaired by degradation with regard to its elastic properties. When, therefore, synthetic rubber is used in its original state, that is to say without previous thermal, mechanical or chemical degradation, it can be mixed (diluted) to a greater extent with softeners without the compound thereby losing its good properties to the same extent as when processing degraded synthetic rubber”. Mr. Templeman naturally draws

attention to the express reference in this document to the deleterious effect of degradation, but it is to be noted that this is only in respect of the elastic properties of the rubber. Moreover, all that the writer of the specification really appears to be saying is this, that if you propose to add unusually large quantities of softener to a polymer you must start with a polymer of high viscosity to achieve satisfactory results. This specification, like *Semperit* (a), contains no instruction to avoid or to minimise mastication. It says: "The compounds according to the invention can be produced on a mill as well as in an internal mixer". This would, we think, indicate to a compounder, seeking to carry out the directions contained in *Semperit* (c) immediately before the priority date of the plaintiffs' patent, that the compounding procedures to be used would be those to which he was accustomed, that is to say, procedures involving mastication. For reasons similar to those given in respect of *Semperit* (a) we do not think that *Semperit* (c) anticipated the plaintiffs' claims.

(5) *Wilmington*

*Wilmington* is concerned with the processing of synthetic rubbers with an economical use of power. The specification points out that whereas natural rubber, being thermoplastic, is readily amenable to breakdown or mastication and after this initial step readily takes up the required compounding agents, synthetic rubbers do not as a rule possess this property in any appreciable degree, and that accordingly some difficulty had been experienced not only in working the synthetic material on machinery designed for natural rubber, but also in procuring uniform dispersions of the various compounding ingredients. It points out that synthetic rubbers are also deficient in tackiness. It proceeds (page 1, line 68):

"The present invention has for its object to obviate the foregoing difficulties and permit the rapid and efficient compounding of synthetic rubbers, particularly of the butadiene co-polymers, under moderate power consumption, to produce a highly plastic mass which is compatible with and readily accepts the compounding ingredients and which possesses any desired degree of surface tack. It has been discovered that this object may be achieved by intimately mixing an emulsion of the synthetic polymer with an emulsion of certain unsaturated hydrocarbons, which act as plasticising or tackifying agents, and coagulating the mixed emulsion formed."

This is a proposal for mixing the plasticiser, i.e. the oil, with the synthetic polymer while it is still in the form of latex, with the consequence that (page 2, line 42):

"the original lack of plasticity and tackiness is thereby overcome and the rubber rendered plastic and readily workable".

*Wilmington*, like the *Semperit* documents, is not concerned with preserving the chemical characteristics of the polymer. It is concerned with the commercial aspects of compounding synthetic rubbers, that is, with producing a stock of rubber softened with oil which can be compounded with the other ingredients of the compound and processed without undue expenditure of power and which possesses a satisfactory degree of tackiness. The mere fact that *Wilmington* is concerned with a different problem from the problem with which the patent-in-suit is concerned would not, however, prevent *Wilmington* from being an anticipation of the patent-in-suit if it disclosed the same invention. Thus in *Molins v. Industrial Machinery Co. Ltd.* (1938) 55 R.P.C. 31, *Bonsack*, the earlier inventor in that case, was not in any way concerned with the problem with which *Molins*, the patentee of the patent there in suit, was concerned. Indeed, the problem which confronted *Molins* was one which could not

arise in the case of Bonsack's machine because it was designed to work at a speed which would not occasion the problem. Nevertheless Bonsack's machine, because of a particular physical feature, was held to anticipate Molins' invention as originally claimed. The difficulties which Wilmington was designed to meet may, however, have  
5 a considerable bearing upon how the Wilmington specification would be read and followed by the skilled compounder to whom it is to be assumed to be addressed.

Mr. Templeman has argued that Wilmington and the patent-in-suit in the present case were concerned with the same problem, namely, the difficulty in processing synthetic rubbers. In this respect Mr. Templeman oversimplifies the position in  
10 relation to the plaintiffs' patent. The problem with which the plaintiffs were concerned was, in our view, how to process synthetic polymers of high molecular weight in such a way as to preserve to the greatest possible extent the molecular composition of the polymers.

The learned trial judge held that the reference to Buna-S at page 1, line 43, of  
15 Wilmington would have been read both in 1947 and 1950 by the skilled addressee as a reference to standard low Mooney GR-S, and Mr. Templeman does not dispute this for the purposes of the present appeal. The learned judge held that the disclosure contained in Wilmington should properly be treated as confined to the low Mooney rubber. Mr. Templeman disputes this, and points to the fact that the formal claims in  
20 Wilmington in terms refer to synthetic rubber in general and not only to low Mooney synthetic rubber. He placed considerable reliance upon the first example contained in the body of Wilmington, which relates to Buna-N latex, that is to say, a nitrile synthetic rubber which, according to Mr. Templeman, must be of a high Mooney rating. We cannot find that this is established by any evidence. Nonetheless, although  
25 the learned judge may well be right in his view that Wilmington should be read as confined to low Mooney rubbers, we prefer to put our decision on a wider ground.

Wilmington contains no direction that the compounder shall select a polymer of any particular Mooney rating. It does not suggest that, if the compound is to be used for the manufacture of a tyre tread, the compounder shall select a polymer different from  
30 that which he would select in the ordinary way, that is to say, a normal GR-S low Mooney polymer. Wilmington does not suggest that the compounder should put into his compound any greater quantity of oil than he would normally use. Although at page 2, line 8, Wilmington states that the unsaturated hydrocarbons, that is, the oils which are recommended, function as plasticisers and true extenders and facilitate the  
35 dispersion of carbon black, the specification read as a whole is not directed to a method of extending the polymer, that is, swelling the mass of the compound by the introduction of larger quantities of oil and fillers than would otherwise have been normal.

Moreover, although Wilmington extends to compounds intended to be used for the  
40 manufacture of tyres, it is not particularly concerned with tyre manufacture but relates to manufacture of rubber goods of all kinds. We see no reason why a compounder seeking to follow Wilmington in making a compound for the manufacture of tyre treads in November, 1950, should have used a polymer of a different kind from that normally employed at that time for the manufacture of tyre treads, or  
45 should have introduced to his compound a quantity of oil much in excess of the quantity which he was then accustomed to use. We think that it is highly unlikely that anyone who in November, 1950, was attempting to make tyre treads on Wilmington lines would have so conducted his operations as to produce the result indicated in claim 1 of the plaintiffs' patent. It certainly cannot be said, in our view, that he would

inevitably have done so. It is not, as we have already indicated, sufficient for the purpose of establishing anticipation to say that the process outlined in Wilmington could have been operated in such a way as to produce the result described in claim 1 of the plaintiffs' patent: Wilmington must be shown to contain clear and unmistakable directions to operate in that way. In our judgment it fails to do so and accordingly does not anticipate the plaintiffs' claim. 5

Last we come to the two McMillan articles. Although Mr. Templeman has really relied only on McMillan II in connection with anticipation, it will be convenient to say something about each of them. Each article relates to certain experiments carried out by the authors upon GR-S soft rubber. The experiments described in McMillan I were concerned with GR-S "hot" rubber, those described in McMillan II with GR-S "cold" rubber. Each series was concerned with the extension of a normal GR-S treadstock (that is, a compound of raw GR-S polymer with oil and carbon black of a kind which would have been conventionally used for manufacturing tyre treads) by adding further quantities of oil and carbon black in a fixed proportion, the one to the other, with the object of increasing the bulk of the compound while maintaining its physical properties as constant as possible. The proportions were so devised that the toughening effect of the carbon was counteracted and balanced by the softening effect of the oil. The McMillan I experiments were based upon a treadstock consisting of a compound of 100 parts GR-S "hot" rubber polymer, 45 parts of carbon black and 9 parts of oil. A series of compounds were made by adding further quantities of carbon black and oil, each compound containing 5 parts of carbon black and 3-5 parts of oil more than the last, until the total carbon black content of the last compound was 70 parts and the oil content was 26.5 parts. Similarly in the McMillan II series of experiments, based on a treadstock containing 45 parts of carbon black and 5 parts of oil to 100 parts of GR-S "cold" rubber polymer, increasing additions each consisting of 5 parts of carbon black and 5.3 parts of oil more than the last were made until the total carbon black content of the last compound was 65 parts and the total oil content was 26.3 parts. These experiments were claimed to have demonstrated that it was possible to increase the total loading of—i.e., to extend—a GR-S treadstock to a sufficient extent to improve significantly its processing characteristics without adversely affecting the physical properties of the product. At the same time an important economy was achieved by increasing the bulk of the compound by the addition of components which were cheaper than the polymer. It will be observed first that the experiments were not concerned with the use of a polymer having a Mooney rating higher than was conventionally used in making tyre treads. The "hot" rubber polymer was presumably about 50 to 60 Mooney. The evidence establishes that the "cold" rubber polymer was 60 plus or minus 5 Mooney. Secondly, the experiments were not concerned with preserving any particular chemical characteristic of the polymer employed: they were not concerned with preserving molecular chains unbroken. Thirdly, no indication is given that any unconventional method of compounding was used. Indeed, McMillan II expressly stated: 10 15 20 25 30 35 40

"In compounding stocks of this type containing relatively high proportions of carbon and plasticiser, it is recommended that these ingredients be added alternately in several portions; e.g. one-third of the carbon, then one-third of the softener, another one-third of the carbon and so on. Alternatively, the total mixing time can be markedly reduced by premixing the carbon black and the plasticiser, a procedure which cannot be readily applied with EPC black but which appears practical in the case of furnace carbons." (E.1(k)) 45

This is quite at variance with the advice contained in the body of the specification for the patent-in-suit which recommended, at page 6, line 70: 50



“The oil should preferably be absorbed in the rubber before any carbon black is added, but the black can be added before the oil is completely absorbed if desired.”

This is reflected in the language of claim 1 of the patent-in-suit, which specifies a method of making a compound comprising the step of mixing a synthetic polymer with at least 20% of a compatible plasticiser in such a way that the plasticiser is distributed through and uniformly absorbed by the polymer before it has been appreciably deteriorated by mastication, and *admixing* at least 30 parts of reinforcing pigment. We think that the passage last cited from *McMillan II* suggests that conventional masticatory compounding processes were in fact used, and that neither *McMillan* article would have suggested to any experienced compounder in 1950 that he should use any other kind of process. This seems to us to be borne out by the fact that the statistical data set out in *McMillan II* show that the Mooney plasticity of the compounds fell progressively as the amounts of carbon black and oil increased. In these circumstances we do not consider that the *McMillan* articles or either of them anticipated the patent-in-suit.

Thus we agree with the trial judge that the appellants have failed in all their attempts to establish the case they put forward under head (e) of section 32(1).

### C. OBVIOUSNESS

#### 20 (1) *General*

Section 32(1), head (f), reads:

“that the invention, so far as claimed in any claim of the complete specification, is obvious and does not involve any inventive step having regard to what was known or used before the priority date of the claim in the United Kingdom”.

In relation to the word “obvious” we were assisted by Sir Lionel Heald reminding us as to how this word came to be introduced into patent law—referring us to the speeches of Lord Herschell in the *American Braided Wire* case (1889) 6 R.P.C. 518 at 528 and in *Vickers v. Siddell* (1890) 7 R.P.C. 292 at 305. There were also cited to us a considerable number of cases in which the meaning of this word was discussed in relation to particular facts. We agree, however, with what was said by Diplock, L.J. (as he then was) and Willmer, L.J. in the *Johns-Manville* case [1967] R.P.C. 479 at 493 and 496 deprecating “coining” phrases which may later be suggested to be of general application. “Obvious” is, after all, a much-used word and it does not seem to use that there is any need to go beyond the primary dictionary meaning of “very plain”.

When head (f) is invoked it is, of course, as previously indicated, for whoever seeks revocation of a patent to show that the alleged inventive step was obvious to a normally skilled addressee in the art. On the way to that end there are here a number of preliminary questions to be resolved. These include the common general knowledge to be imputed to that addressee; whether what had to be done to achieve the step was truly a matter of inventive experiment or merely a matter of that type of trial and error which forms part of the normal industrial function of such an addressee; what documents he would find in the course of such researches as he would be expected to make; and how he would regard those documents in the light of common general knowledge. Then finally one has to consider whether the step is properly described as a new combination of integers or merely as a collocation of old ones. None of these

questions, some of which inevitably overlap, is easy to resolve, and on each it is for the appellants to establish their contentions.

As regards obviousness as a whole the trial judge approached the matter correctly when he said, [1970] F.S.R. at 302\*:

“The question of obviousness is seldom easy to decide. It has been said to be a kind of jury question and, in the days when patent actions were tried before a judge and jury, was treated so. The decision is ultimately one for the court which cannot let its function in this respect be usurped by the witnesses, though undoubtedly the evidence of the witnesses may help the court to arrive at its decision. It must be decided objectively and, being a jury question, it is right that all the relevant circumstances of the case should be taken into account. That this is the correct view of the matter is clear both from the old cases and the new.”

His observations naturally apply with equal force to each of the questions which need resolution on the way to giving a final answer on the issue.

It is as well in relation to the evidence in the instant case at this point to refer to the need for objective as opposed to subjective tests. The question is whether the step was obvious to a normally qualified skilled addressee in 1950—as opposed to the person who in fact claims to be the inventor or to any particular rival of his. Indeed, it is not infrequent that the inventor is not himself called as a witness in a patent action. That, however, does not rule out evidence as to how the problems were in fact approached at the relevant time by the patentee, by his rivals, or by others. What they did may provide significant signposts leading to the answer to the objective test. In this behalf the literature—both the widely read documents and the internal memoranda of Goodyear and the Office of Rubber Reserve already mentioned—provide valuable evidence: as also do the actual experiments carried out by the plaintiffs in the year preceding the date of the patent-in-suit—though this material happens originally to have been admitted into evidence on an issue other than obviousness.

## (2) *The Semperit and Wilmington Specifications*

With those preliminary observations it is convenient at the outset to consider Mr. Templeman's strongly pressed submission that although the Semperit and Wilmington specifications formed no part of the *common general* knowledge of the skilled addressee, yet when we consider the issue of obviousness he must be deemed to have seen and read every word of them.

His primary contention was that the addressee must be deemed to be a man who as regards every potentially relevant specification “sits down, reads and knows every word in it” and is a man with an “enormous memory”. In the alternative he argued that the addressee must be taken to have made a diligent search (see the *Technograph* case, per Lord Reid, [1971] F.S.R. at 193-D) for all relevant documents including specifications, and that upon such a search he would have come across Semperit (a), Semperit (c) and Wilmington. In either case it was urged that this addressee must be deemed to have fully read the three specifications and that, keeping them simultaneously in mind, in addition to the widely read publications, the alleged inventive step or steps would have been obvious to him.

\* [1971] R.P.C. at 237.

If the primary submission is correct then as regards specifications the word “known” in head (f) of section 32(1) includes all *public* knowledge and thus embraces everything that is “published” within the meaning of that word as defined in section 101 of the 1949 Act: moreover, it makes the words “known or used” in relation to obviousness  
5 have the same meaning as in head (e) which deals with anticipation. On this point there was a divergence of opinion in the *Technograph* case between Lord Reid (with whom Lord Morris of Borth-y-Gest agreed) and Lord Diplock. The former at page 193 said:

10 “Attention was drawn to the fact that both heads (e) and (f) in section 32 contain the words ‘having regard to what was known or used . . . in the United Kingdom’. I doubt whether they were intended to mean the same in each case. If they were there would now be little, if any, difference between novelty and obviousness”,

and a little later stated:

15 “I think that in head (f) the words should have the more natural meaning of what was or ought to have been known to a diligent searcher”.

Lord Diplock, on the other hand, when discussing head (f), said at page 201:

I do not, as at present advised, think that the meaning of those words is any different in paragraph (e).”

20 Both opinions were obiter in view of concessions made in their Lordships’ House, and having regard to what we are about to determine on the assumption that Lord Diplock’s view is correct we do not find it necessary to decide between them on this important question, which manifestly needs an authoritative answer in due course. In case, however, this matter goes further and our determination on that assumption  
25 is found not to be correct, we think it apposite to say that as at present advised we would, if it is open to us, have been disposed to hold that “known” in head (f) does not include everything that comes within the definition of “published” in section 101: and we note that the word “published”, although it appears in section 14(1)(e) (which deals with obviousness in relation to oppositions to grants), is not incorporated into  
30 head (f) of section 32(1), which incidentally uses language very different to that in head (a).

We would add that we find some cogency in the observation in Halsbury’s Laws of England, Vol. 29, page 30, para. 63:

35 “It would be absurd to presume that knowledge of every publication affecting any branch of industry or art must be simultaneously in the mind of a person engaged therein”,

although those words relate to common general knowledge. No authority binding on us was cited which states in general terms any proposition as wide as that of Mr. Templeman’s primary submission, nor indeed any which seems to make it necessary  
40 to give the word “known” in head (f) a meaning other than one natural in relation to a real person who is a skilled addressee—and that meaning would include what a competent addressee ought to know, but would not burden him with anything further in the nature of constructive notice.

45 As regards diligent search, a phrase which we were given to understand originates from Lord Reid in *Technograph* (supra), we take this as apt to describe what research

groups employed by large-scale concerns, such as those in the *Technograph* case and in the instant case, ought to know. Such researches, however, can involve not only heavy expenditure but also questions of priorities in the use of available manpower. What extent of search is appropriate in a given case and what would be its probable results are questions of fact. On these we have not the advantage of the views of the trial judge, who delivered judgment before the date of the *Technograph* decision in the House of Lords. 5

We have already referred to the location of the Semperit specifications and to the main clues to their existence. We also have before us some evidence from the appellants' witnesses as to searches made with a view to finding material with which to attack the patent-in-suit. Those searches were, of course, initiated with advance knowledge that those concerned were looking for "material relating to oil-extended rubber". The person who actually found the Semperit documents was not called; but a Mr. Jackson, employed to make such searches, was in fact occupied upon them in various directions for some four to six weeks. Dr. Duck expressed the view that whilst he might have got "an enormous fee" for the search, yet if one is determined enough one can find anything, and did not consider that there would have been difficulty in bringing the Semperit specifications to light. 10 15

Taking the evidence as a whole, and having looked at the terms of the abridgements (G.8, pp. 8,220 and 8,217) available in Book 8 of Vol. 3 of the Patent Office, we doubt whether, on balance of probabilities, a normally diligent search by persons seeking a solution to the problem of the "gap" mentioned earlier in this judgment but not knowing the answer in advance would have brought Semperit (a) or Semperit (c) to attention as potentially useful material. It may perhaps be pertinent to note that these applications, unlike the Wilmington specification, were not mentioned to us as having been relied upon in the course of the lengthy opposition proceedings which, as previously mentioned, occupied some five or six years. 20 25

In view of the difficulties inherent in providing an answer to this question we propose to assume that because either Mr. Templeman's primary or his secondary submission might prove to be well founded, the Semperit specifications form part of the material to be considered in relation to obviousness. We have made a similar assumption in regard to the Wilmington specification which on balance of probabilities is more likely to have been found in the course of an appropriate search. 30

Accordingly when seeking to put ourselves into the position of an appropriate notionally skilled addressee in November, 1950, faced with the problem of filling the "gap" in industrial knowledge, we have not only had regard to the common general knowledge of such an addressee as shown by the widely read publications and by the evidence given by witnesses at trial, but in addition have in conclusion taken into account the three specifications under discussion. We have assessed this material as a whole in the light of the previous history which the trial judge rightly regarded as important. 35 40

### (3) *Pre-November 1950—Attitudes towards the problem of the gap*

When referring earlier to the gap and the resulting problem we cited passages from two documents bearing on this issue. They are not the only ones of importance. We do not propose to make numerous citations from the mass of material but would mention three references to previous work on the problem of making use of high Mooney rubber for tyre treads. Dr. Dinsmore in his first lecture (January, 1949) 45

when discussing "Adjustment of properties by changes in polymer" refers (see G.11, 11,153) to "the tremendous amount of work done on the subject", goes on to relate the advantages of high viscosity and the steps taken to process such rubbers, and ends by saying "the net effect is a better quality polymer but one which cannot be  
5 processed in present equipment". Goodyear's previously quoted internal memorandum of 17th January, 1951, (G.5, 5,071), when urging further investigation of the problem, referred at 5,073 to:

10 "features of the present investigation which might possibly distinguish it from the innumerable studies of the effects of large amounts of softeners of all types on the different varieties of rubbers made over the years".

Mr. Baker, in the course of his evidence, referred to the fact that in 1942, when he was employed by Firestones, "we were trying so desperately at that time to make more tyres and to make good tyres and learn how to handle some of the rubber we had at that time".

15 These passages constitute some of the evidence which plainly shows that not only was there the gap but that it was one which those in the industry were interested in filling—a point to which we will return.

In relation to whether oil-extension of rubber could in 1950 have been regarded as an obvious way of filling that gap, there was considerable discussion as to whether  
20 the material before the Court showed some prejudice, as Mr. Templeman called it, against that avenue. Taking first of all the "widely read" material as a whole, including such standard works as Springer, 1947 (G.11, 11,063) ("the use of large amounts of softeners proves to be rather undesirable from a technical point of view"), and Caoutchouc, 1948 (11,044), ("in the case of Buna-S too great a use of plasticisers  
25 would be incompatible with good mechanical properties"), and the Rubber Age (August, 1945) Report on German Synthetic Tyres (E.1(e), page 569), ("it is known that high softener content adversely affects quality"), there is much to show that oil softening of very tough polymers was regarded as having such adverse effects that a skilled addressee would be disinclined to look to it for a solution.

30 To counter this Mr. Templeman, so far as widely read publications were concerned, relied in the main on Dr. Dinsmore's first lecture of January, 1949, (G.11, 11,150) and the McMillan papers of August, 1947, and March, 1950 (E.1(g) and E.1(k) respectively) prepared by a Shell team. The former, however, did not really discuss this question, whilst the latter were, as appears from our examinations of them  
35 when considering anticipation, concerned with conventional processing of hot and cold GR-S, polymers of a viscosity around 60 Mooney—low compared with the polymers to which the problem of the gap related (see judgment page 312-B). We agree with the trial judge that the contents of these papers cannot fairly be taken to outweigh the general trend of the other publications. It is, moreover, to be observed that a  
40 perusal of the memoranda over the period 23rd June, 1947 (where the problem is propounded, G.11, 11,104) to November, 1950, of the keenly interested expert officers of the Office of Rubber Reserve, who can hardly have been unaware of the above papers, shows that they clearly did not regard any of them as making obvious that which Mr. Templeman has asserted must have been so plain. (Incidentally,  
45 McMillan of themselves by their graphs and tables show something of the degree of experimentation needed when seeking to resolve tyre tread problems and also of the number of interlocking factors that have to be scrutinised whilst they are in progress.)

In addition to the trend of the material in the various widely read publications we have noted the evidence of Mr. Baker and of Mr. Taylor, the Firestone compounder (see passages referred to in trial judgment, [1970] F.S.R. at pages 308-D and 309-A) as to the great surprise which met the success of the plaintiffs' process—a surprise which reflects the previous existence of prejudice against oil extension as an avenue of exploration. Mr. Baker indeed took the view that if he had been asked to explore this method of filling the gap he would have regarded it as a waste of time. 5

Also relevant is the evidence of Mr. Davies (a retired Dunlop chief compounder) and Mr. Taylor (of Firestones) as to what had occurred when they had respectively sought to depart from the conventional processing method of incremental additions of oil in Banbury mixing. Attempts to add large initial quantities of oil, they said, resulted in "the batch going dead" and the materials "just going round and round" ("sloshing" or "churning" around). 10

In the upshot so far as common general knowledge is concerned, taken by itself (i.e. without referring to the three specifications in issue), we consider that the evidence as a whole shows that despite Dr. Duck's views, to which we will refer later, the notional skilled addressee seeking in 1950 to fill the gap would be biased against spending his time exploring the possibility of oil extension as a means of using *high Mooney* polymers. That type of solution would clearly not seem obvious to him from such knowledge. In addition to the above material, but before turning to the question of commercial success, we find cogency in the rhetorical questions posed by Mr. Gratwick in the course of his address. Why, he asked, if the use of oil-extended rubber in the manner put forward in the patent-in-suit was obvious, did not the Germans find this out and use it when it would have been of such great benefit to them in the course of the War? Why did not Mr. McMillan and his co-authors (all of Shell) in the course of their 1950 paper relating to GR-S rubber (E.1(k)) state that it was obvious? Why, notably, did not the U.S. Office of Rubber Reserve, which was so concerned with efficient and economic production of tyre treads, state in its recommendations of the 1st November, 1950 (G.5, 5,065) or in some other paper before the date of the patent-in-suit that it was obvious? 15  
20  
25  
30

Thus well before coming to the question of what weight should be given to the commercial success of the process, which was alleged to have "blinded" the trial judge, we find a bulk of material in favour of the plaintiffs' case against obviousness—leaving for later consideration whether the matters urged by the appellants outweigh those on which the plaintiffs rely. 35

#### (4) Commercial Success

We next turn to the widespread commercial success of the process described in the patent-in-suit which followed the surprise recognition of its value. As previously stated, this success was conceded by the appellants. So it is only necessary to mention that the facts and figures set out in the trial judgment at page 275-A were not challenged by the appellants, nor were the consequent broad calculations put before us by Mr. Gratwick to the effect that on the latest available figures the annual production cost savings on the polymers marketed by the appellants I.S.R. were of themselves likely to be of the order of £2 million per annum or more. 40

The contents of several post-1950 publication documents are also in point. These include commendation of the new process in Dr. Dinsmore's second lecture in 1952 (G.5, 5,054). Reference can also be made to the Goodyear document cited in the first 45

instance judgment at page 311-B: in it that rival company claimed to have invented the oil extension process and said (G.11, 11,248B) “the discovery of oil-extended rubber is regarded as one of the most important to come out of the rubber research programme for many years”—a passage not without significance despite the “puff” element of self-advertisement.

Commercial success is, of course, not of itself conclusive on an issue of obviousness, but it has been treated in case after case as a valuable weight in favour of the patent. Mr. Templeman sought to minimise that weight in the instant case by aid of what Lord Herschell said in *Longbottom v. Shaw* (1891) 8 R.P.C. 333, a case concerning an improvement in the method of forming a row of hooks. The improved article had supplanted the old article in the market, but in relation to that particular commercial success Lord Herschell, at page 336, said:

“If nothing be shown beyond the fact that the new arrangement results in an improvement, and that this improvement causes a demand for an apparatus made in accordance with the patent, I think it is of very little importance.”

He went on to say that the position would be different if it were shown “that men’s minds were likely to have been engaged upon a mode of remedying the defects”.

That, however, was a case in which the patentee had failed to adduce any evidence of the history of the alleged invention. In particular, there was no evidence of any previous demand for an improvement in the subject matter. In the instant case, however, there is, contrary to the submissions made on behalf of the appellants, ample evidence of such a demand: we have already referred to the interest in the gap and the investigations in the U.S.A.—which in the circumstances are relevant to this aspect of obviousness. It is, however, as well to add that proof of previous demand for a particular improvement is not, of course, a necessary prerequisite to establishing that commercial success is of weight: for instance, resigned acceptance of an existing state of affairs may exist and be relevant—especially when there is in effect a tied body of consumers, as for tyres, who must anyway take the only available products. Indeed, we find it difficult to think that there are competitive commercial concerns who are not continually interested in and seeking advances in the economic production of whatever article they may be selling: the phrase of Mr. Baker as to a manufacturer’s interest in “the dollar value” (overall performance and cost) of tyres illustrates this factor.

In our judgment the very widespread adoption of the plaintiffs’ process both for its economies in the use of raw polymer and for its improvements in the properties of the finished article is of value on the issue of obviousness.

It being apparent from what has already been said that there is a considerable weight of material in the balance of the scales against the plea of obviousness, we now turn to consider what are submitted to be the main factors to be put into them on the opposite side.

As regards commercial success it was contended that the vastly increased use of synthetic rubber for tyres after June, 1951, was due not to the adoption of oil-extended rubber but to other factors such as the advent of cold rubber, the adoption of an improved carbon black known as HAF, and the exigencies of the Korean war—which created both a demand for rubber and a shortage of natural rubber. We naturally assume that each of those factors—and notably the Korean war, which affected the U.S.A. as from June, 1950—would increase the demand both for synthetic rubber for

tyre treads and for pressure for improvements in processing it. On the other hand, this does not in our judgment affect the true point made on behalf of the plaintiffs, that whatever may have been the effects of the other factors, nonetheless the widespread adoption of the oil-extended rubber process was due to its own intrinsic merits and would have occurred whether or not the other factors had operated— 5  
though the extent of its use might have been initially less had there been no Korean war. Upon the evidence it is correct to say that the combined saving in cost of production coupled with the increased treadwear and other beneficial properties were such as would have catered for a long-felt want and would have been of great value whether or not there had been such a war. 10

Amongst other points submitted on behalf of the appellants were two that are somewhat closely linked in practice. It was urged that all that was needed by the hypothetical skilled addressee in order to come upon the process disclosed in the patent-in-suit was a series of trial and error activities of a skilled compounder, rather than the sort of experiments which can be ranked as of an inventive nature. Looking 15  
at the authorities it is apparent that the demarcation of the borderline between trial and error in the ordinary course of the work of an addressee and the type of experiments which rank as being inventive is on occasion very difficult. Nonetheless it is a question of fact in each case on which side of the borderline fall the steps taken.

Once more we have had to keep in mind the references in the material before us to 20  
previous experiments and investigations, as well as noting the nature of those experiments which were carried out by the plaintiffs as a preliminary to claiming patent rights. We also have had in mind that the hypothetical addressee must be assumed to be of standard competence at his work without being of an imaginative or inventive turn of mind (cf. Lord Reid's observations in the *Technograph* case [1971] F.S.R. at 25  
193-A). We have come to the conclusion that in the light of past experience in the industry any experiments needed to lead to the relevant process do not fall within what might be called the run of the mill type of trial and error workings of an employee however skilled.

A closely linked question is whether in the upshot the process of the patent-in-suit 30  
is more properly described as a new and inventive combination of integers or a mere collocation of them. Again the borderline is one not easy of demarcation, especially as it has been aptly said (see *Halsbury*, Vol. 29, page 30, para. 63) that it

“has been held from the earliest times that a new manufacture may be created, 35  
although such manufacture when dissected may consist of individual items all of which formed part of public knowledge”.

Whilst remembering the caution needed to avoid putting obstacles in the way of a skilled man making proper use of his talents in the ordinary way, we consider that in the instant case the relevant process falls on the inventive side of the line.

In all these matters, as also when considering whether the plaintiffs did no more 40  
than discover that a known process could produce hitherto unsuspected results, we have, of course, not overlooked the evidence Dr. Duck gave in support of the view that the process in question was one that was obvious to a skilled addressee and one at which he would arrive without difficulty if he set his mind to solve the problem of the gap. Dr. Duck, however, was a witness who had something like fifty patents 45  
 (“ten more or less”) credited to his name and was reasonably submitted by Mr. Gratwick to be of a rather different calibre from that type of skilled addressee which Lord Reid had in mind. In the face of all the other evidence available, we have felt that it is necessary to some extent to discount his evidence on the point of obviousness.



Next came the submission that the process must have been obvious to a skilled addressee because within a relatively short time after the filing of the patent-in-suit two other claims were made to have invented the same process. One claim was made by the Goodyear Tyre Co. (see judgment [1970] F.S.R. page 311-B), the other by the Phillips Petroleum Co. (see page 311-D).<sup>\*</sup> The latter company indeed made a U.S.A. application for a patent on 6th April 1951, followed by a convention application in this country on 24th March 1952, which, however, was revoked upon opposition proceedings by the plaintiffs.

As regards these claims it is necessary first of all to note the course of events in the U.S.A. from 7th November, 1950, onwards. On 7th November the plaintiffs sent to the U.S. Office of Rubber Reserve their letter (G.5, 5,067) headed "22% More Rubber Now", which proclaimed in somewhat flamboyant terms that they had discovered a new process which they were not prepared to disclose until they had "covered every phase of the patent situation". It was stated that "the material is quite revolutionary". This letter, coming at a time when there was already pressure to produce more synthetic rubber, caused much agitation in official quarters and created or rekindled animosity between the plaintiffs on the one hand and the Office and other tyre manufacturers on the other. The internal memoranda and correspondence from then onwards shows an intense interest in the matter and the pressure generated by the information: the suggestion that the plaintiffs would seek to secure the protection of patent rights caused much resentment. There were immediately set in train measures with a view to seeing if the discovery could be matched. There is nothing in the documents to show that clarity how far or by what methods some interested party may have put two and two together as regards the general nature of the plaintiffs' discovery, but it is clear that there must have been a measure of co-operation between the Office of Rubber Reserve and one or more other manufacturers which resulted in various experiments being made not least in the direction of oil-extended rubber. In these circumstances we do not think that the proper inference from what occurred is that as at the priority date (20th November, 1970) the relevant process was obvious—on the contrary, when one looks at the memoranda of the Office of Rubber Reserve one wonders (as already mentioned) why, if it was obvious, it was not so stated in them.

In our judgment neither the above points nor any others urged on behalf of the appellants provided an effective counter-weight to the material that tells against the plea of obviousness.

That leaves the final question as to whether a skilled addressee who is assumed to have read and remembered amongst all other available material the three specifications *Semperit* (a), *Semperit* (c) and *Wilmington*, would by reason of these have come to regard the plaintiffs' solution of the problem as obvious, despite the fact that his common general knowledge would have biased him against exploring the chances of oil-extended rubber providing a solution. In this behalf we agree with the approach adopted by the trial judge when he correctly said ([1970] F.S.R. at page 312):<sup>†</sup>

"It seems to me to be very dangerous and in law not permissible to assess obviousness in the light of carefully selected pieces of prior knowledge only".

Whether or not in that particular passage he had in mind the three specifications as being the "carefully selected pieces", it is in our judgment right to apply to them the process of reasoning adopted by the trial judge. Bearing in mind what has, when

<sup>\*</sup> [1971] R.P.C. at 244, 245.

<sup>†</sup> [1971] R.P.C. at 246.

discussing anticipation, already been said as regards each of these three specifications, we have come to the conclusion that, assuming Mr. Templeman's submissions as to their position in this case to be correct, they would not have affected a skilled addressee's mind in the way that he submits.

Having regard to our assessment of the evidence on the issue of obviousness we do not find it necessary to examine in detail the authorities cited to us on this subject. It is sufficient to refer to two passages in judgments that have been much cited and are of high authority. 5

The first is that in the judgment of Fletcher Moulton, L.J. in *British Westinghouse v. Braulik* (1910) 27 R.P.C. 209. Though it was quoted in the first instance judgment, [1970] F.S.R. at page 313-C,\* it provides such an apt warning against an ex post facto analysis of an invention of the type which the appellants sought to apply in the instant case that it merits citation. 10

"I confess that I view with suspicion arguments to the effect that a new combination, bringing with it new and important consequences in the shape of practical machines, is not an invention, because, when it has once been established, it is easy to show how it might be arrived at by starting from something known, and taking a series of apparently easy steps. This ex post facto analysis of invention is unfair to the inventors and in my opinion it is not countenanced by English patent law." 15 20

The second is in the judgment of Tomlin, J. (as he then was) in *Samuel Parkes & Co. Ltd. v. Cocker Bros. Ltd.* (1929) 46 R.P.C. 241 at 248:

"Nobody, however, has told me, and I do not suppose anybody ever will tell me, what is the precise characteristic or quality the presence of which distinguishes invention from a workshop improvement . . . The truth is that, when once it had been found . . . that the problem had waited solution for many years and that the device is in fact novel and superior to what had gone before and has been widely used, and used in preference to alternative devices, it is, I think, practically impossible to say that there is not present that scintilla of invention necessary to support the patent." 25 30

In our judgment the evidence in the instant case shows that there is far more than a "scintilla of invention" in the process for which protection is claimed in the patent-in-suit. The appellants have failed by a considerable margin to establish their plea of obviousness. On the contrary, the plaintiffs have positively established that the invention for which protection is claimed in the patent was not obvious. 35

#### D. INSUFFICIENT DEFINITION

##### (1) General

We turn now to the remaining issue in the case, which was dealt with in the judgment of the trial judge under the heading "Ambiguity and Insufficiency". The word "ambiguity" is not used in the relevant section of the Patents Act, 1949, and it has been common ground in the appeal that what the appellants are alleging in this part of the case is that the plaintiffs failed to define sufficiently the scope of the claims in the patent. 40

\* [1971] R.P.C. at 246, lines 39 to 45.

Section 32(1) of the Act provides that a patent may be revoked inter alia on the ground:

“(i) that the scope of any claim of the complete specification is not sufficiently and clearly defined or that any claim of the complete specification is not fairly  
5 based on the matter disclosed in the specification.”

The appellants do not allege any failure by the plaintiffs to comply with the second part of this paragraph or with any of the provisions of the preceding paragraph (h) which deals inter alia with a failure sufficiently and fairly to describe the invention and the method by which it is to be performed, and as regards want of definition the appellants’  
10 attack on the patent has (apart from two subsidiary points) been concentrated in this appeal on the computed Mooney test which forms an integer of claim 1 and certain other claims of the patent; no argument having been addressed to us on the alternative point (involving the requirement of claim 1 that the plasticiser is distributed through and universally absorbed by the polymerisation product) which was advanced before  
15 the trial judge and was rejected by him on page 318\* of the judgment, and in the appellants’ main argument no reliance being placed for the present purposes, as distinct from anticipation and obviousness, on the further requirement of claim 1 that such absorption is to take place before the product has been “appreciably deteriorated by mastication”. The attack, insofar as it is concentrated on the computed Mooney test,  
20 cannot in any event avail the appellants as respects those claims of the patent, including claims 30 to 32, in which the test laid down is in terms of raw and not computed Mooney.

### (2) *The Computed Mooney Test*

The computed Mooney test is made an integer of claim 1 and certain other claims  
25 by the requirement that the polymerisation product shall have a computed Mooney plasticity of at least 90. What is denoted by computed Mooney plasticity is explained in the body of the specification and it has been common ground that for the present purpose it is both legitimate and necessary to read together the body of the specification and the claims, the former providing in effect a dictionary for the purposes of  
30 the latter. (See per Lord Haldane in *B.T.H. Co. Ltd. v. Corona Lamp Works Ltd.* (1922) 39 R.P.C. 49 at 67.

Before turning to the explanation of computed Mooney given in the specification it is necessary to repeat what has been earlier mentioned in this judgment, that in  
35 England and the U.S.A. (by contrast to Germany, where a different method called DEFO was used) the standard method of measuring viscosity has been by use of a Mooney viscometer (or plastometer), the nature of which is described on page 281† of the judgment under appeal and which provides a figure of viscosity, normally read after four minutes, either for a raw polymer (“raw Mooney”) or a compound (“compounded Mooney”), both these readings being required in the process of tyre  
40 manufacturing, the first to characterise the polymer for processing purposes and in particular as to its ability to absorb carbon black, and the second to ensure that the compound will be extrudable, for which purpose it is common ground that the compound has to have a viscosity broadly between 40 and 80 Mooney. It is also common ground that in the case of a tough polymer having a raw Mooney of over  
45 120, the Mooney reading can be unreliable by reason of slippage between the rotor of the viscometer and the polymer, and that even in the case of a polymer having a lower Mooney than 120 the reading may similarly be unreliable if the polymer contains gel.

\* [1971] R.P.C. at 250, 251.

† [1971] R.P.C. at 220.

It is against this background that the passage in the specification relating to computed Mooney falls to be considered. It begins (at page 5, line 49) with a reference to the circumstances, already referred to, in which a Mooney reading may be unreliable and therefore fail to characterise the polymer. It then goes on to claim that the inventors have found that there is a substantially straight line relationship between the amount of a given oily plasticiser required to obtain a compound Mooney and the raw Mooney reading, provided a given carbon black is used in the proportion of 50% of the total weight of the rubber and the oil, and have also found that the compounded Mooney of a given polymer varies in approximately a straight line relationship with the amount of oily plasticiser contained in it, and that on this basis they have developed the concept of computed Mooney.

There follow two sentences which have been the subject of much discussion both at the trial and on this appeal. The first of these is a statement that

“The ‘computed Mooney’ of a gel-containing polymer is the true Mooney of an equivalent of a gel-free polymer.”

(p. 5, 1.110–2.)

It is common ground that this statement, as worded, is unintelligible. The learned judge came to the conclusion that something had gone wrong with the wording and that what it was intended to convey was that in the case of high Mooney polymers and those containing gel, the concept of computed Mooney is equivalent to the concept of raw Mooney as applied to low Mooney gel-free polymers and the validity of this conclusion has not been attacked in the appeal. There was no evidence that anyone was or could have been misled by this sentence, and we do not consider that it is of any importance as regards the issue with which we are now concerned. In the second sentence, which is of greater importance and much relied on by the appellants, it is stated (at line 120) that

“The computed Mooney and the measured raw Mooney are the same within accuracy of measurement at the lower values, i.e. below 120 for these gel-free polymers.”

The appellants claim that this is a reference to all gel-free polymers, the plaintiffs, whose submission the judge accepted, that it refers only to those polymers which were the subject of their experiments, and to this question we shall later return.

The specification, at page 6, sets out the procedure to be followed by the use of fig. 2 (on page 24) for ascertaining the computed Mooney of a raw polymer, namely, having prepared a compound, to mark the ascertained compound Mooney on the vertical line appropriate to the oil loading used and then, if the mark falls in the neighbourhood of any of the lines A, B, C (which represent the broad limits of an extrudable compound), to read off the appropriate computed Mooney on the left of the graph. The procedure to be followed involves the use of the specified proportion of carbon black to which reference has already been made and adoption of the mixing procedure set out in the specification which includes, *inter alia*, working the rubber for about one minute in a warm Banbury at approximately 200 degs. F. The specification points out at page 6 (line 112) and again at page 7 (line 27) that the major benefits of the invention are obtainable when the Mooney plasticity of the polymer exceeds 115.

(3) *The Attack on Computed Mooney*

The appellants' attack on the patent on the ground of want of definition, being concentrated as we have said on the computed Mooney test, embraced two main complaints. As to each of these the appellants have relied on figures disclosed both by experiments made by themselves in September–October, 1968, and of which the results are contained in Volume F, and also by experiments made by the plaintiffs between March and October, 1950, which were part of the process by which they made the alleged invention and also arrived at the concept of computed Mooney. The results of these experiments made by the plaintiffs are contained in Volume G.4 and they are also referred to in an article (G.6, 6,060) written by the inventors and published in the "Rubber World" in June, 1951.

The appellants' first complaint is that whereas, so it is claimed, the body of the specification indicates to the reader that there is only one computed Mooney figure for any given polymer, the results of the computed Mooney tests throw up different figures of computed Mooney for the same polymer according to the proportion of oil mixed with it for the purposes of the test, which lays down a specific proportion of carbon black for the mix but no specified proportion of oil although it is an integer of claim 1 that the oil content of the mixture shall be at least 20% of the weight of the polymer. In the result the appellants claim that the Mooney readings for the same polymer may vary considerably according to the oil loading and that some of the figures thrown up by the computed Mooney test may be above and some below 90.

The appellants' second complaint involves the sentence already referred to on page 5 (line 120) of the specification, which states that the computed Mooney and the measured raw Mooney are, below 120, within accuracy of measurement the same for "these gel-free polymers". This, they claim, conveys that the values will be the same for any gel-free polymer below 120 Mooney and they then proceed to show from the experiments not only that for certain polymers below 120 the raw and computed Mooney figures are different but also that such differences are found within the plaintiffs' own experiments.

In both these respects the appellants claim that a reader of the patent seeking to keep outside the scope of the plaintiffs' monopoly may be unable to ascertain whether he has done so and may be misled by the very terms of the Mooney test itself which the inventors laid down as a criterion for infringement.

Before referring to the figures on which the appellants rely it should be mentioned at this stage that it is common ground between the parties that actual measurements of Mooney for the same polymer or compound are subject to a degree of "scatter" arising from variations in the rubber, oil or carbon black, or from human error or from irregularity in the operation of the machine. These variations were the subject of evidence given at the trial. Dr. Smith put the possible level of variations arising from differences of rubber within a bale at plus or minus  $1\frac{1}{2}$  at the 50 Mooney level (i.e. 6%) but greater as between bales over a longer period, whilst the Firestone Book referred to variations of plus or minus  $7\frac{1}{2}$  in relation to the appellants' 1710 and 1712 masterbatches. It is in conjunction with these levels of unavoidable variations that the figures disclosed by the experiment fall to be considered, but the appellants claim that a distinction must be drawn between unavoidable variations and those produced by the artificial Mooney test invented by the respondents.

The appellants' experiments (at F., pages 13, 17, 21) involving three blends of a low and a high Mooney polymer and each including several samples with different oil

loadings, reveal respectively differences of 40, 28 and 29 between the highest and the lowest resulting computed Mooney figures. Blend IV, of which the computed Mooney figures range from 74 to 102 and the raw Mooney was 65, is relevant to the second as well as the first of the appellants' complaints, for it is argued that an addressee, reading the statement at page 5, line 120, of the specification, would assume from a raw Mooney figure of 65 that he was outside the patent and need not make a computed Mooney test, or alternatively if he did make such a test he might obtain a computed Mooney either above or below 90. 5

The trial judge in his judgment, [1970] F.S.R. at page 317-A,\* adopted plus or minus 6 as the extent of variation in the Mooney figures for this blend but his calculation was based on a document (G.4, 4,006B) in which only three of the six samples were included and it appears that the first sample was excluded on the ground that its compound Mooney was substantially less than 40 and therefore did not satisfy an integer of claim 1, and the last two were also excluded on the ground that their oil loading did not amount to 20%, which is another integer of the claim. On the basis that all the samples should have been included, Mr. Templeman, for the appellants, claims that the true range of the computed Mooney should be taken as plus or minus 14. It is to be noted, however, that Dr. Smith, when averaging the computed Mooney figures of the infringing Intol 1710, had similarly excluded the first two mixes of which the compound Mooney was over 80, and Dr. Duck accepted that the last two figures of the appellants' Blend IV (F, page 17) were to be discounted because the oil was below 20%, and in our judgment the trial judge was right in excluding, when considering the range of computed Mooney figures, samples which did not satisfy either the processibility or the oil content integers of the claim. 10 15 20

It is clear from Document F (pages 2 and 3 and fig. 1) that the appellants in mixing the latices 1502 and 1778 for the purposes of the above tests, had sought to obtain a raw Mooney of 90 for the blend and for this purpose had blended two polymers of very different Mooney values, and had done so at the polymer-producing plant, as distinct from the factory, which is not on the evidence a normal commercial procedure. The plaintiffs claim, therefore, that these were experiments deliberately directed at the very edge of the patent and that in considering what weight should be given to them we should have regard to the passage, to which we shall later refer, in which Lord Shaw in *B.T.H. v. Corona* refers to the case of putting puzzles near to the dividing line. 25 30

A further criticism made by the plaintiffs is that the appellants' experiments were, as is common ground, carried out at a Banbury temperature of 100 degs. F. instead of the temperature of 200 degs. F. referred to in the specification (page 6, line 64). Dr. Duck described this difference in temperature as being most unfortunate, and accepted that starting with a cold Banbury could have influenced the results, but could not say in the absence of experimental data whether, if the tests had been conducted at 200 degs., the figures would or would not have come down. In view of this uncertainty the correctness of the figures for the purposes of a computed Mooney test is open to doubt, but we have not in the end regarded this issue as a very important one. 35 40

It is now necessary to turn to the results upon which the appellants rely, disclosed by the plaintiffs' own experiments (G.4, 4,005-6). These did not include computed Mooney figures for at the time when the experiments were made that concept had not been thought of, but agreed computed Mooney figures have since been added to the respective tables. In experiment 228 the raw Mooney of the polymer was 98 and the 45

\* [1971] R.P.C. at 249.

computed Mooney figures range from 92 to 132. In experiment 251 the raw Mooney figure was 93 and the computed Mooney figures are 89, 91 and 100. It is claimed for the appellants that an addressee having read the statement at page 5, line 120, of the specification would assume that with a raw Mooney of 93 he was inside the patent, 5 but if he made computed Mooney tests he would have obtained one figure below and two above 90, and similar considerations apply to experiment 235. The appellants claim that their own experiments with Blend IV and the plaintiffs' experiment 251, considered together, establish that there is a range of difficulty for the addressee where the raw polymer is between 65 and 93 Mooney and that it may extend beyond these 10 figures. Further, it is pointed out that in experiments 235 and 249, polymers having respective raw Mooney figures of 90 and 56 were found to have the same computed Mooney of 75 which it is said is inconsistent, even on the judge's construction of "these gel-free polymers" as limited to those which were the subject of the experiments, with the plaintiffs' statement that raw Mooney and computed Mooney are the same, 15 within accuracy of measurement, below 120.

(4) *The Plaintiffs' Argument as to Computed Mooney*

As we have already stated, these experiments of the plaintiffs form part of the process by which they made the alleged invention and also arrived at the concept of computed Mooney, and in relation to the whole of the appellants' case of insufficient 20 definition it is legitimate, and in our view necessary, to follow the process, apparent from the documents before us, by which the plaintiffs arrived at the computed Mooney concept, for we are satisfied that it is relevant on an issue of want of definition to consider what degree of care was taken by the inventors in defining the scope of the invention and what difficulties they encountered in doing so. The plaintiffs having 25 obtained from the experiments the results above referred to, and finding that the compounded Mooney figures differed for the different oil loadings, endeavoured to ascertain whether these differences exhibited any consistent pattern, and successive stages of this investigation are reflected in the diagrams at G.4, pages 4,033-6, the last of which represents the computed Mooney test as set out in fig. 2 of the patent-in-suit. 30 The remaining document to which it is necessary to refer in this context is Table 14 at G.6, 6,069, in which the raw Mooney and computed Mooney figures for the various polymers included in the plaintiffs' experiments are set out in separate columns and below 120 the differences of computed from raw Mooney range from plus 3 to plus 8 and minus 3 to minus 10.

35 On the basis, which we accept to be correct on authority to which we shall later refer, that the issue of sufficient definition is to be decided in the light of practical considerations and not of puzzles set at the edge of the claim, and that what the inventor is required to do is to give the best definition that the subject matter admits of, the plaintiffs claim that the three questions which the court should ask itself as regards 40 the computed Mooney test are:

- (1) Whether there was a problem which prevented reliance on normal measurement;
- (2) If so, whether the test devised was the best available in the circumstances; and
- 45 (3) Whether it does any harm to anyone carrying out the normal operations of a business.

What weight should be given to the answers to these questions in the overall context of this case is a matter to be considered later but they are plainly, in our judgment, relevant questions and we proceed to consider the respective submissions of the 50 parties in regard to them.

As to the first question it is unnecessary to say more than that it is common ground that the Mooney viscometer readings are unreliable above 120 and may be so below that figure, and Dr. Smith said that this created a very substantial problem.

As to the second question the plaintiffs rely on the fact that, although the patent-in-suit was obtained in 1950 and the nature of the invention, and of the computed Mooney concept, disclosed by the inventors in the published article of June, 1951, to which we have referred, no one has hitherto suggested any better test, and no one, apart from the appellants, has offered any criticism of the computed Mooney concept. Dr. Smith considered the approach made by the plaintiffs to the problem to be a reasonable one and intelligent in that it involved a standard compounder's test. Dr. Duck accepted that it could be a reasonable one and was reasonable if the inventors were "hide-bound by Mooney determinations", but he pointed out that there were other means of measuring viscosity, such as DEFO. Mr. Templeman, for the appellants, suggested that an alternative and better test might be founded on raw Mooney or on DEFO or on some other basis but, as already stated, no alternative has yet been found, and it is difficult to see how any test based on raw Mooney could overcome the unreliability of the viscometer, while a test, if such could be found, based on DEFO would involve moving away from the measure of viscosity used in this country and in the U.S.A. with which operators are familiar.

As to the third question the plaintiffs rely on the trial judge's finding at page 314\* that

"in practice polymers well above 90 computed Mooney are normally used for tyres in order to take advantage of the high treadwear resistance of the tougher polymers"

and his conclusion that as a practical matter the appellants' computed Mooney argument is unreal. With regard to difficulties which could arise at the edge of the claim they say that it is not unreasonable that anyone working in that region should have to take a greater degree of care to ensure that he is outside the patent; that in these circumstances more tests are called for than would otherwise be appropriate; and that in any event it is not the law that a patent is to be held invalid for want of definition merely because particular circumstances may arise in which it is difficult to decide whether it has or has not been infringed, provided the court is able to formulate the question to be answered in deciding whether there has been infringement or not.

Mr. Templeman attacked the judge's conclusion that the appellants' argument on computed Mooney is unreal as a practical matter, and, in relation to the evidence that polymers of 120 Mooney or higher have in practice been used for oil extension in tyre manufacture, he asked us to bear in mind that some manufacturers have taken out licences under, and others are engaged in litigation with reference to, the patent, and this we do, but in our judgment there was ample evidence to justify both the judge's finding and his conclusion above referred to, with which we agree.

As to difficulties at the edge of the claim Dr. Smith's evidence was that it would be desirable for a compounder who wished to know whether he was infringing the patent to repeat experiments and if he found that the computed Mooney was within 10 points of the 90 Mooney level imposed by the claim he would have to be more careful and conduct his experiments very accurately, and it is, we think, a fair summary of the

\* [1971] R.P.C. at 247.



combined evidence of Dr. Smith and Dr. Duck that near the edge of the claim it would be necessary to take care and repeat experiments and that in such a process averaging could have a place, and this in our judgment answers the criticism advanced by Mr. Templeman that because the patent requires ascertainment of only a single  
5 computed Mooney figure there is no room for averaging.

(5) *Construction of the Specification*

It will be convenient, at this stage, to deal with two questions of construction which arise on the appellants' arguments. It has been argued in the first place that the wording of those claims which include the computed Mooney test, read in conjunction with the  
10 body of the specification, conveys to the reader that there is only one computed Mooney for every polymer irrespective of the proportion of oil included in the mixture from which the compound Mooney was calculated. In the second place it is argued that the sentence at page 5, line 120, of the specification conveys to the reader that the computed Mooney and the raw Mooney of any gel-free polymer are within accuracy  
15 of measurement the same below 120, and that on this basis a compounder working with a polymer having a raw Mooney substantially under 120 would be led to assume that he could rely on the raw Mooney figure and need not make a computed Mooney test. As already stated, the allegation which the appellants had originally pleaded that the patent was obtained on a false suggestion or representation (Patents Act, 1949,  
20 section 32(1)(j)) was not pursued at the trial; and it has consequently been contended by Mr. Gratwick that the arguments with which we are now concerned amount to false suggestion or nothing, but we are prepared to accept that the extent to which a skilled addressee might be misled in either of the above respects by the wording of the specification is a relevant matter to be considered on the issue of want of definition.  
25 As to the first of these arguments, no evidence was adduced at the hearing that a skilled addressee with knowledge of the art of compounding would suppose from the wording of the specification and claims that the computed Mooney of a polymer would be the same irrespective of the proportion of oil in the compound to which the test had been applied, and it is significant that Dr. Duck in particular gave no evidence  
30 in support of this argument. We are unable to accept the argument, for we cannot believe that a skilled compounder, having read the specification and having considered fig. 2, would suppose that the resulting computed Mooney figure would necessarily be the same for different oil loadings.

The second argument involves consideration of the words "these gel-free polymers"  
35 on page 5, line 124, of the specification, which the appellants claim is a reference to all gel-free polymers, but which the trial judge held was a reference only to the polymers which had been the subject of the respondents' experiments to which we have referred. The paragraph in the specification which ends with these words begins by saying:

40 "We have found that in any given polymer modified so as to have substantially no gel . . ."

and we think that the true construction of the paragraph, and what it would convey to the reader, is that, based on the experiments they have made, the inventors have reached the conclusion that for gel-free polymers generally the raw and computed Mooneys are within accuracy of measurement the same below 120. In this respect the  
45 passage goes, we think, somewhat further than the trial judge held, but there can, in our view, be no doubt as to this statement having been made in good faith and reasonably on the basis of the comparisons to which we have earlier referred. In any event, the appellants' argument fails in our judgment at the next stage, in which it is alleged that because of these words the addressee would be justified in relying upon

the actual Mooney of a polymer below 120 and not carrying out a computed Mooney test: but this, however, involves treating words which are merely part of the explanation of the computed Mooney test as if they formed part of the definition of the claims, and they cannot, in our judgment, reasonably be read as absolving the addressee from making a computed Mooney test. There was no evidence at the trial that anyone had so construed them or had been misled by them, and we do not think that in practice anyone could be misled by them. 5

(6) *Relevant Authorities*

We turn now to certain authorities to which we were referred in relation to the present issue. In *British Thomson-Houston Co. Ltd. v. Corona Lamp Works Ltd.* 10 (1922) 39 R.P.C. 49 a patent was granted for improvements in incandescent electric lamps and one of the claims was for such a lamp "having a filament of large diameter or cross-section". The defendants in an action for infringement did not contend that the specification gave the lamp-maker insufficient material to work by but that the words quoted did not sufficiently define the ambit of the monopoly. This argument was 15 accepted by Sargant, J. and the Court of Appeal, but rejected by the House of Lords on the ground that the adjective "large" must be read with reference to the filaments which were in use before the date of the patent and that so read they provided an adequate definition of the scope of the monopoly. This case is clear authority for the proposition that a patent is not necessarily invalid for want of definition because it 20 has used relative terms. In this respect we do not find the decision itself of much assistance as regards the issue of computed Mooney with which we are concerned. The plaintiffs, however, have relied on certain passages from the speeches in the *Corona* case, in particular the passage quoted by the trial judge at page 319 of the judgment, in which Lord Shaw refers to the ease of putting puzzles in the thin strip 25 of mechanical territory which lies at the edge of a patent claim; Lord Cave's acceptance of the proposition that

"the mere fact that knowledge and skill, and even some experimental tests, may be necessary in putting a patented invention into practice is not sufficient to invalidate the patent if the nature of the invention is adequately described"; 30

and the similar reference made by Lord Finlay to the tests which are necessarily employed in the manufacture of every article.

In the case of *Natural Colour Kinematograph Co. Ltd. v. Bioschemes Ltd.* (1915) 32 R.P.C. 256, where a petition to revoke a patent on the ground of insufficient description succeeded, the facts are of no assistance so far as concerns the present case but the speeches of Lord Loreburn and Lord Finlay contain passages which are helpful as regards the general approach to be made by the courts in considering the issue of want of definition. Lord Loreburn said, at page 266: 35

"It is the duty of a patentee to state clearly and distinctly, either in direct words or by clear and distinct reference, the nature and limits of what he claims. If he 40 uses language which, when fairly read, is avoidably obscure or ambiguous, the patent is invalid, whether the defect be due to design, or to carelessness or to want of skill. Where the invention is difficult to explain, due allowance will of course be made for any resulting difficulty in the language. But nothing can excuse the use of ambiguous language when simple language can easily be employed, 45 and the only safe way is for the patentee to do his best to be clear and intelligible."

Lord Parker, after pointing out that the legal principles as to ambiguity might be thought to bear somewhat hardly on patentees and their agents, said at page 269:

5 “The court, however, will always make due allowance for the difficulties of the case, and will not impute mala fides without strong reason, or be astute to deprive a patentee of the benefit of a valuable invention, either because of his imperfect acquaintance with the art, or because of the carelessness or want of skill of his agent.”

We do not read the passage quoted from Lord Parker’s speech as indicating that on such an issue as this the court should strain to uphold the patent, but the reference  
10 in both passages to the necessity of making allowances for any difficulties of the case clearly involves that the issue of want of definition must always be considered in relation to the particular facts. This principle is accepted in the statement of Lord Simonds in *Raleigh Cycle Co. Ltd. & Anr. v. H. Miller & Co.* (1948) 65 R.P.C. 141 at 149, that “a greater degree of clarity than the subject reasonably admits of is not to  
15 be demanded of the patentee”, and in that of Lord Normand in *Cleveland Graphite Bronze Co. and Vandervell Products Ltd. v. Glacier Metal Co. Ltd.* (1950) 67 R.P.C. 149 at 154, where it is stated that the obligation of an inventor is to give “as clear a definition of the monopoly claimed as the subject admits of”.

In the *Cleveland Graphite* case last mentioned the judgment of Somervell, L.J. in  
20 the Court of Appeal (1949) 66 R.P.C. 157 at 174, contains the following passage upon which reliance is also placed by the plaintiffs:

25 “There are clearly inventions as to which borderline cases can be imagined, and I know of no principle which says that a patent is bad because it is possible to imagine an article as to which there might be argument as to whether it does or does not infringe. What is necessary is that the specification should enable the court to formulate the question to be answered.”

In this passage Somervell, L.J. is clearly saying that it is not the duty of the inventor so to define the scope of his claim as to ensure that it can never be difficult to decide the question of infringement, but only to enable the court to formulate the question  
30 which a skilled addressee wishing to avoid infringement should ask himself, and on the ensuing appeal to the House of Lords no criticism was made of this approach in any of the speeches.

#### (7) Conclusion

The cases above referred to involve very different facts from those with which we  
35 are now concerned but we have found considerable help in the passages which we have quoted as regards the approach which the Court should make to an issue of want of definition. It is clear in our judgment that the question whether the patentee has sufficiently defined the scope of his claims is to be considered in relation to the facts of each case, that allowance is to be made for any difficulties to which the circumstances give rise, and that all that is required of the patentee is to give as clear a  
40 definition as the subject matter admits of. It is also clear in our judgment that, while the court is to have regard to all the relevant facts, the issue of definition is to be considered as a practical matter and little weight is to be given to puzzles set out at the edge of the claim which would not as a practical matter cause difficulty to a  
45 manufacturer wishing to satisfy himself that he is not infringing the patent. We accept also that definition of the scope of a claim is not necessarily insufficient because cases may arise in which it is difficult to decide whether there has been infringement or not

provided the question can be formulated which the court has to answer in deciding the issue of infringement.

Applying these principles to the present case the answers to be given to the three questions posed by the respondents, and to which reference has already been made, are clearly of the greatest importance, although they have to be considered in conjunction with all the circumstances of the case. In our judgment on the evidence the answers are, first, that there was an obvious problem which faced the present inventors in defining the scope of their claims; second, that the solution they adopted was a reasonable one and no better has been found since the patent was granted; and third, that the computed Mooney test imposes no serious difficulty on a manufacturer carrying out the normal operations of a business. Such a manufacturer would on the evidence be working with polymers of 120 Mooney or above. If contrary to the general practice he chose to work with polymers in the general range of 80 to 100 Mooney it is common ground that he would have to take special care, but the question he would have to ask himself, if he desired to avoid infringement, can be formulated and in our judgment is, as Mr. Gratwick submitted, not "How close to the wind can I sail?", but "Have I satisfactorily established that the computed Mooney attributable to this polymer is below 90?", and it is not, in our judgment, unreasonable that in order to arrive at the answer to this question he would have to make a number of tests.

It is necessary at this stage to refer briefly to two supplementary arguments put by Mr. Templeman on the present issue. The first of these was that Table II in the second McMillan article (E.1(k), page 663) shows, as was accepted by Dr. Smith, that the authors had worked with a polymer having a raw Mooney of 60 plus or minus 5; that on the basis of the appellants' experiments such a polymer could have a computed Mooney of 90 or more, and that therefore a compounder seeking only to follow the McMillan teaching by using such a polymer might find himself inside the patent-in-suit. In our judgment the short answers to this submission are, first, that it was not established on the evidence that anyone mixing with such a polymer 20% of oil would produce a compound within the extrudable limits set by the claim or that the compound Mooney calculated from the compound would be 90 or more; and, secondly, that, as we have earlier concluded in this judgment (under the heading of "Anticipation"), nothing in the McMillan articles would have suggested to an experienced compounder that he should use any other process than the conventional masticatory process in use in 1950.

Mr. Templeman's second supplementary argument was that if, contrary to his primary submission earlier considered and rejected in this judgment under the heading of "Anticipation", the requirement of uniform absorption of the product before it has been appreciably deteriorated by mastication is a true integer of the plaintiffs' claim, a compounder wishing to follow the Semperit teaching and to keep outside the patent-in-suit would be put in difficulty by vagueness of the words "appreciably deteriorated".

We reject this argument on two grounds, first that the words quoted are in our judgment a legitimate use of relative terms within the principle laid down in the *Corona* case, and, second, that the evidence, as we have earlier concluded, established that a compounder wishing to follow Semperit and a compounder wishing to follow the patent-in-suit, would conduct their operations in radically different ways.

[No. 17]

Court of Appeal

*Insufficiency*

For the foregoing reasons, which are substantially those given by the trial judge, the appellants' case under head (i) of section 32(1) fails.

It follows that we agree with the trial judge that the appellants have not succeeded in any part of their attack on the patent-in-suit, and the appeal must be dismissed.

- 5 The form of order was dismissed on 28th July. The appeal was dismissed with costs. A certificate for three counsel was granted. Leave to appeal to the House of Lords was refused.

J. G. D.