FILM STUDY GROUP

REPORT

T.O.M. REEL NO. 91

Prepared by

THE ATLANTIC REFINING COMPANY

Atlantic Refining Co.
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SCANNING OF REEL #91
(Orig. Ident. Reel 1-G)
U. S. Government Technical Oil Mission
BIOS Trip 872a to Berlin Area

Collected notes include:

1. Lists of CIOS targets in Berlin area. Frames 5-10. Gives (in English) target numbers, corresponding names of German organizations, location, key personnel, and remarks.

2. Instructions to investigators operating in the British zone of occupation. Frames 11-14 (in English).

3. Target 30/Opportunity.

Document of the Reich's Institute for Water and Air Hygiene. Lists of proprietary products for pest control and their manufacturers. Frames 15-27.

Target 30/11.01. Staatliches Material Prufungsamt Berlin-Dahlem, Unter den Eichen 86/87.

1. Organization, Frames 31-33 (in English). Gives divisions and names of persons in charge of divisions for the State Material Testing Office in Berlin-Dahlem.

Lists of publications are given in items 2 - 9 as follows:-

2. Professor Siebel, 1940-1944, Frames 34-38.
Blumenthal and Bussmen as authors or co-authors 1940-1944, Frames 39-41.
Richter, Schikorr as authors or co-authors 1940-1944, Frames 40-43.

3. Dr. Otto Werner, Frames 44-47.

4. Publications from the Department of Nonmetallic Inorganic Building Materials 1940-1945, Frames 48-52.

5. Wood preserving, Frames 53-56.

6. Organic materials, Frames 57-58.

7. Synthetics, Frames 59-62.

8. Textiles, Frames 63-64.

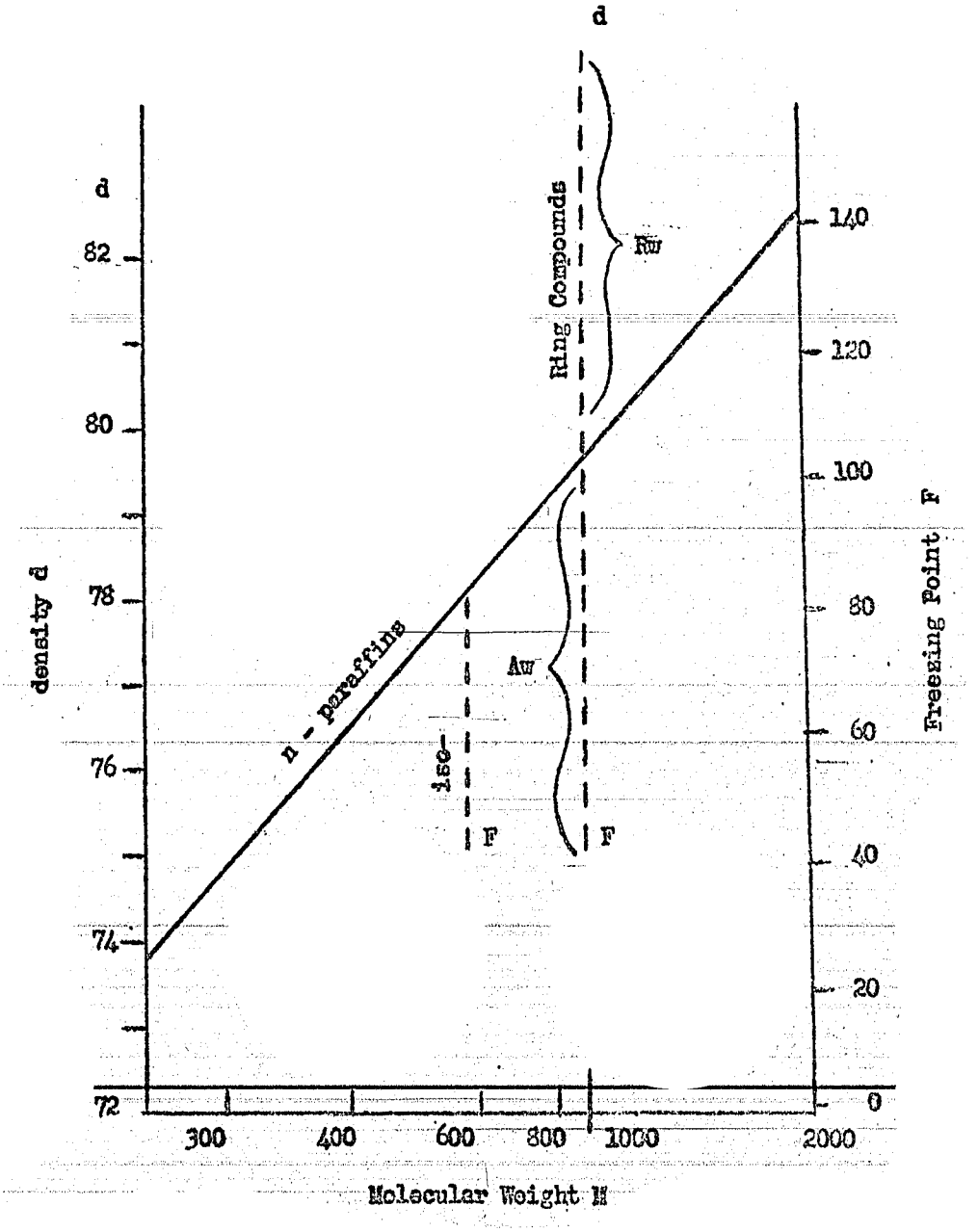
9. Paper, Frames 65-66.

10. Publications from the Reichs-Röntgenstelle since 1940, Frames 67-69.

11. Tests of five rubber mixtures containing Naftolen for Darter A.G. Relates to compounding, and comments upon the physical tests obtained. Frames 71-81.

12. Test on Naftolen Z.D. and Tables. This material (Frames 81-96) again refers to compounding tests and has little significance to the petroleum refiner.

REEL #91
Section No. 20
Frames 295-308



Target 30/Opportunity. Rhenania-Ospag, Berlin. Tirpitzufer 60-62 (Shell House).

13. Price lists (1941) for all Petroleum Products. Any residual significance of this material may be the identification of common petroleum products distributed in Germany in that period, and, in some cases, properties of these materials. Frames 98-128.

14. Prices of Aviation Fuels, etc. 1944. Frames 129-135. Material of no technical interest.

15. Supplying of the Aviation Industry and DLH with Operational Materials. Frames 137-140. No importance.

16. Prices (1944) of Aviation Lubricants and Special Products. Frames 141-157; not important.

17. List of all Shell products for Aviation use. Not important. Frames 158-171.

18. Lubrication Directions for use of the ground forces of the German Air Arm. Frames 172-204.

Target 30/Opportunity. Olex Deutsche Benzin, Petroleum Gesellschaft Berlin, Martin Lutherstrasse 61 - 66.

19. Identification, characteristics and brand names of special oils by Olex and ASV (Arbeitsgemeinschaft Schmierstoff-Verteilung G.m.b.H.). Frames 208-293. Material adequately described by its title.

Target 30/2.02. Deutsche Erdöl A.G. Berlin, Martin Lutherstrasse 61 - 66.

20. Research in Structure for separation of Solid Paraffin (reprints from Oel und Kohle 38, 419 (1942). Frames 295-308. The authors H. Gross and K. H. Grodde draw upon the relationship of the properties of hydrocarbon classes and departures from regularity to distinguish type of compound in an unknown or a mixture.

The equations relating freezing point (F) and the molecular weight (M) developed by Eteman & Sawyer were combined with that of Ivanovszky relating density (d) to freezing point to form a new equation relating density to molecular weight. A plot for normal paraffins in which the abscissa is M divided by 14.95 and the ordinates are density (left) and freezing point (right) fall upon a straight line in which the values of density and freezing point increase progressively with molecular weight. (Facing figure) Equimolecular iso-paraffins or ring compounds (naphthenes and poly-methylene rings) depart appreciably from this line for normal paraffins. In the case of iso-paraffins, the freezing point departure characterizes this group.

From equation 3:

$$\text{Eq. 3.} \quad 1000d^{*} = 511 + 311\,\frac{M}{M+95}$$

the increase in density can be arranged to give the so-called "ring value" Rw:

$$\text{Eq. 4.} \quad Rw = 1000d - 511 - 311\,\frac{M}{M+95}$$

which is in effect a measure of ring closure as compared to normal paraffins of equal molecular weight. By definition the value is 0 for normal paraffins, while for iso-paraffins it is usually below 5; ring compounds, however, may be up to 100. Analogous treatment of the freezing point-molecular weight relationship of Meesam and Sawyer yields equation 5:

$$\text{Eq. 5.} \quad Aw = 311\,\frac{M}{M+95} - 205 - 0.75F^{**}$$

in which the asymmetry value, Aw, is a measure of freezing point lowering with respect to equi-molecular weight normal paraffins. The values will be positive for iso and ring compounds, but will be 0 for normal paraffin.

The two index figures, Rw and Aw, are used with molecular weight, density and freezing point to decide whether a normal, iso or ring paraffin is present, and within the last two groups they express quantitatively the departure from equi-molecular weight normal paraffins. If it is only necessary to determine whether a normal paraffin is present then it will suffice to use the sum of the ring and asymmetry values:

$$\text{Eq. 6.} \quad Sw = Rw + Aw = 1000d - 716 - 0.75F$$

This is the simplest criterion of a normal paraffin and does not demand knowledge of the molecular weight whose determination is long, difficult, and subject to error.

The viscosity was considered a possible property to use in place of molecular weight. It was found that the expression developed by Ubbelohde and Walther: $W = \log \log V_k + 0.8$ for normal paraffins varies linearly with $\frac{M}{M+95}$. V_k is the kinematic viscosity in centistokes. For 100°, the value for normal paraffins with more than 18 carbon atoms will be equation 7:

$$\text{Eq. 7.} \quad 100W = 311\,\frac{M}{M+95} - 269$$

d^{*} = density at 90°

F^{**} = freezing point

Since branching has practically no effect upon the viscosity of aliphatics, equation 7 holds also for iso-paraffins. Ring compounds possess higher viscosity than equi-molecular weight normal paraffins. Therefore, this divergence is used in the double logarithmic W value, and in consequence of the small number is only of minor significance. Equations 8 and 9:

$$\text{Eq. 8.} \quad Rw\ (vis) = 1000d - 780 - 100W$$

$$\text{Eq. 9.} \quad Aw\ (vis) = 64 + 100W - 0.75F$$

express ring value and asymmetry value in terms of W and density in one case, and W and freezing point in the second case. For normal and iso-paraffins, these equi-viscosity distinguishing values are the same values as the equi-molecular values. Only for ring compounds is the equi-viscosity ring value smaller than the equi-molecular result because of the increased viscosity resulting from ring closure.

The refractive index of hydrocarbon changes with molecular weight and constitution in a fashion analagous to density. It is possible to employ this characteristic in place of density. The relationship between refractive index and freezing point as developed by Ivanovsky is shown in equation 6-A:

$$\text{Eq. 6A.} \quad Sw = 2100\ (nD^{90°} - 1400) - 0.84F$$

This equation is practically the same figures as derived for the sum values calculated from density. The above determination of physical characteristics can be done upon samples of one gram.

The authors have applied the method outlined to the inspection of petroleum fractions.

22. Specifications for Lubricants of Die Deutsche Viscobil G.m.b.H. (a distributing company for Deutsche Erdöl A.G.)

This material dated Aug. 11, 1945 Berlin-Schoneberg appears in German and English, and is probably a statement made by someone when interviewed by the Technical Oil Mission. The material is of little consequence beyond revealing the presumed quality of petroleum products furnished by this concern. Frames 309-328.

23. Petroleum Producing Companies in Germany and Austria, together with their output.

The material dated Berlin-Schoneberg Aug. 11, 1945 appears to have been dictated to the Technical Oil Mission. It enumerates companies, their capitalization and production chiefly for the years 1938 and 1944. Frames 329-335.

24. History and Management of Deutsche Erdöl A.G.

Material in English and German dated Berlin Aug. 11, 1945 and having the appearance of interview of the Mission with personnel of this oil company. No technical importence. Frames 336-343.

25. Organization of the Petroleum Economy during the War. Material in English and German dated Berlin Aug. 10, 1945 presumably resulting from interrogation of German personnel located in Berlin. No technical importance. Frames 344-350.

Target C 30/69. Edeleanu G.m.b.H. Berlin-Schoneberg-Martin Lutherstrasse 61-66.

26. History of Edeleanu G.m.b.H. An undated statement in English by Jodeck, chief engineer of the company. No technical importance. Frames 353-355.

27. Selective Solvents Separation of Low Temperature Tars obtained from Brown Coal and Oil Shales. A printed pamphlet by Ernst Terres of the Edeleanu Company. This article, probably presented in June of 1942, describes in detail the methods and results obtained in separation and refining of tars and brown coal oils, particularly by the use of SO_2 and dichlorethene. Frames 356-372.

28. Plant for Processing Brown Coal Tars. Print dated Aug. 11, 1945 giving schematic flow diagram embodying solvent extraction with SO_2 and dewaxing with dichlorethane. ($C_2H_4Cl_2$). The drawing bears the imprint of Edeleanu; the captions are in English. No pressures, temperatures or quantities are stated. Frame 374.

29. Toluene Extraction Plant at Concordia. Edeleanu drawing 30-10948-A. Process flow diagram showing principal instrumentation but no process conditions. There is no text. Frame 376.

Target 630/413. Kaiser Wilhelm Institut for Strömungsforschung, Berlin N W 87, Franklin Strasse 27/29.

30. Report (1945) of the Division of Friction Research. This section, Frames 377-496, consists of what appeared to be a dictated statement by G. Vogelpohl, Aug. 13, 1945 telling of the activities and the principal personnel for that division of the Kaiser Wilhelm Institute for Flow Research, and appends several articles which had appeared in the technical literature:

(a) Calculation of axial turbines by means of Strecken Profilgitter (extended profile net works, charts, ?) by Fritz Weinig, Zeit. Angew. Math. U. Mech. Dec. 1933, page 448. (Frame 398)

(b) Determination of the contraction of flow in tubes from the Navier-Stokes equations, by G. Vogelpohl; Ibid, page 446. (Frame 396)

(c) Wind tunnel experiments on the atmospheric resistance of railway vehicles, by G. Vogelpohl; reprint from V.D.I. (Frame 400)

(d) Fluid flow research with the ultramicroscope. G. Vogelpohl and D. Mannesmann. (Frame 438)

(e) Mathematical treatment of lubricating Problems of Bearings, by G. Vogelpohl, appearing in Oel u. Kohle, Jan. 1940. (Frame 462)

(f) Integration of the Reynolds' equation for bearings of finite width, by G. Vogelpohl in Ingenieur-Archiv, 14, 192 (1943). (Frame 473)

Target 30/Opportunity. Versuchsanstalt für Kraftfahrzeuge (VfK) Berlin-Charlottenberg.

31. Communication from I.G., Hoechst on Anti-corrosion media for Motor Fuel Containers. Correspondence Oct. 6, 1943 transmits memorandum of Sept. 29, 1943 (Frame 499) describing experiments to overcome objectionable features when motor fuels containing corrosion inhibitors were used in service. Salts of cyclohexylamines gave good protection when used in amounts of about 1/10 of 1%. (Frames 497-514)

Target 30/Opportunity. Technische Hochschule, Berlin, Institute für Technische Stromungsforschung.

32. Review of Research Jan. 1938-1945. This is a statement by Dr. R. Wille, Berlin, Aug. 11, 1945 and is alleged to be an account of the principal scientific research carried on in the Berlin Technische Hochschule by the Institute für Technische Stromungsforschung (Flow Research). Virtually all the work was of a mechanical engineering nature associated with problems relating to internal combustion engines and planes. Frames 515-521.

33. Report of Committee on 2-Cycle Motors. A series of papers presented at meeting May 20, 1941 in Berlin. (German Power Transport Research)

(a) Experimental results on a small Otto 2-cycle motor with unsymmetrical indicator diagram. (J. Zeman) Frames 530-540.

(b) New piezo quarts instrument of high standard frequency. (E. Schmidt) Frames 541-548.

(c) Relation between change in load and performance. (E. Niedermeyer) Frames 549-558.

(d) Quantitative evaluation of Slow-motion photographs of purge gas front in a combustion engine cylinder. (R. Wille) Frames 559-571.

(e) Research on dust filters. (U. Schmidt) Frames 572-587.

The subject matter is of interest primarily to mechanical engineers rather than relating to aspects of petroleum refining.

34. Flow Characteristics of the Intake System of Foreign Aero Motors. I.T.S. report 775 by R. Wille and H. Kehr dated May 25, 1944. This section pertains to engine design, and places special emphasis upon the valves and ports of airplane motors. Frames 591-632.

35. Patent Application and Drawings of a New Method for Atomising Liquids with the help of Flowing Gases. Communication June 12, 1942. Frames 636-651. Documents obtained from Depl. Ing. Foerster of the Versuchsanstalt für Kraftfahrzeuge, Berlin.

36. Research in Fibre Oil Filters. VfK report 297 by U. Schmidt and H. Schwarz, Nov. 5, 1942. The filters were effective and brought about a saving of 30-40% in oil used. Frames 655-664.

37. Cold Tunnel Starting Tests of Motors using Oils diluted with Naphtha. VfK report 272 Feb. 24, 1942 by Mundler, in which a series of experiments were performed on a Mercedes-170 V motor at -34°. The lubricant was Nerag oil whose performance was compared to that of the same oil diluted with 15% of naphtha. Frames 665-670.

38. Development of Apparatus for Determining Ratios of Oil Dilution. VfK report 267 June 23, 1942, by U. Schmidt and A. Dietzmann, Frame 672. Viscosity of mixtures of naphtha and oil in known proportions was determined in the temperature range -30° to +30°. The permissible naphtha content at -20° and lower could be 30%, while at 30° no dilution was permissible. It will be understood that this work refers to ease of cold starting of engines. Frames 671-679.

39. Opinion on Influence of Speedoil (addition) Lubrication on Cylinder and Piston Ring Wear. Report Feb. 9, 1938 by Prof. G. Beck of Dresden, Frames 693-700. Two comparison motors were operated, in one of which Speedoil lubrication additive was used and the other without the Speedoil additive. Cylinder and piston ring wear during the test period from cold to warm-up conditions was to be measured quantitatively. There is no statement as to the origin and specific properties of Speedoil. This material was added to the gasoline equivalent to 2.4% of the fuel. A total of 240 cycles in which the motors were heated from 15° up to 95° were carried out, and at the conclusion of the test the measurements indicated 20-25% less cylinder wear by the use of Speedoil and 42-52% less wear on the rings.

40. Development of an Oil Filter by the Staff of the Power Vehicle Commission. This VfK report 4, probably written in 1943, is incomplete both in text and illustrations. Frames 701-705.

41. Starting Behavior of Diesel Motor Fuels. The figures illustrating this VfK report 13 show the profound influence of cetane number of Diesel fuel upon the starting temperature for engine. Frames 706-710.

42. Behavior of Anti-freeze Media. This VfK report 12 is undated, though probably in period 1943. It appears to be a highly condensed summary of the work without any supporting data. Frames 712-716.

The investigation of corrosion by substances added to the cooling media (VfK report 11). Again this is probably a summary report of work done in the period 1943. Frames 717-720.

43. Minutes of meetings on Internal Combustion Motors. Conference probably held in Oct. 1941. The following papers were presented and appear as part of the formal report. Frames 721-827:

(a) Influence of nozzle design on fuel spray form and dispersion, by W. Oschatz. Frames 728-747.

(b) Influence of air movement and sprays thru the nozzle on power and fuel consumption in a high speed diesel motor, by Ullman. Frames 748-773.

(c) Conversion of rotary chamber motors to diesel wood-gas service, by Kohlopp. Frames 774-781.

(d) Combustion in diesel gas processes, by W. Rixmann. Frames 782-794.

(e) Comparative determination of tendency to knock in multicylinder Otto motors, by Schulze. Frames 795-801.

(f) Theory of engine preignition, by Dreyhaupt. Frames 802-815.

(g) Combustion of liquefied fuel gas in pure diesel process, by Dreyhaupt. Frames 816-825.

44. Notes on the Characteristics, Testing and Behavior of Diesel Oils in Motors. Taken from Zeit. V.D.I. 78, 1147 (1934). Frames 829-830.

45. Construction of Racing Cars. An article by Forster appearing in Zeit. V.D.I. 82, 208 (1938). No technical importance. Frames 832-834.

Target 30/Opportunity. Names of personnel of the Technische Hochschule, Berlin. Frames 835-836 show pages taken from the school catalogues for winter semester 1944-1945, pages 116-120.

(This ends scanning of Reel #91)