# ABSTRACTS.



## AUTHOR INDEX.

The numbers refer to Abstract Numbers.



# Oilfield Exploration and Exploitation.

## Geology.

**1532. Bacterial Release of Oil from the Sedimentary Materials.** C. E. Zobell. *Oil Gas J.*, 2.8.47, **46** (13), 62.—Laboratory work shows that bacteria can liberate oil from oil-bearing sediments by several mechanisms. Solution of calcareous matter may be a most important mechanism. Hydrocarbons may be liberated from organic matter. Bacteria may decompose sulphate minerals.

Carbon dioxide, methane, and hydrogen produced bacterially may promote oil flow. Bacterially-formed detergents can aid in liberating oil from sediments, and bacterial growth on solid surface may displace oil.

Oil in small amounts has been released from samples of Athabaska tar sand in the laboratory.

Sulphate-reducing bacteria seem to be the most versatile oil-releasing organisms, but methane, hydrogen-producing, and other anaerobic bacteria may be more effective if they can be injected into oil-bearing formations along with appropriate nutrients.

More research is needed on these problems. G. D. H.

**1533. November Exploration Exceeds 1945 Period.** Anon. *Oil Wkly*, 30.12.46, **124** (5), 49.—419 exploratory wells were completed in U.S.A. in November 1946 to give a total of 4035 wells for the first 11 months. 70 of the November tests were producers, 37 discovering oil. 11 oilfields were extended. A new Weber sand field, Elk Springs, was opened in Colorado.

The results of the November exploratory completions are summarized by States and districts. A table lists the 1946 discovery well with some pertinent data.

G. D. H.

**1534. U.S.A. Crude Reserves.** *Oil Wkly*, 20.1.47, **124** (8), 48.—At the end of 1945 32 U.S.A. companies held 16,979,400,000 brl of reserves, 81·5% of the total U.S. reserves. Standard Oil Company (N.J.) held 3,500,000,000 brl of reserves; the Texas Company held 1,500,000,000 brl. A table shows the domestic and foreign reserves of the companies, but data on foreign reserves are incomplete. Five of the companies together hold 15,470,000,000 brl of foreign reserves. G. D. H.

**1535. 4831 Exploratory Wells Were Completed in 1946.** Anon. *Oil Wkly*, 27.1.47, **124** (9), 50.—432 exploratory wells were completed in U.S.A. in December, making the 1946 total 4831. 17·1% of the December wells were successful, and for the whole year 19·4% were productive. 1946 had 515 oil discoveries of which 310 were new fields; there were 104 gas discoveries, 75 being new fields, and 72 distillate finds, including 30 new fields.

A table summarizes by States and districts the exploratory well results in December and throughout 1946; a second table groups the discoveries according as they are oil, gas, or distillate discoveries, new fields or new pays, and extensions.

The new oil, distillate, and gas fields, and new pays discovered in U.S.A. in December 1946 are listed with the salient points noted. G. D. H.

**1536. Wildcat Drilling at New Peak.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 130.—During 1946, 4830 exploratory tests were drilled in U.S.A. (the 1945 figure was 4510). The 1946 tests yielded 935 discoveries, of which 687 were new oil, distillate, or gas fields, or sands, and 248 were extensions. 513 new oilfields or pays were found, 308 being new fields. 1946 gas discoveries numbered 103, including 74 new gas fields. Texas yielded 118 new oilfields and Illinois 30.

A table gives yearly from 1937 the numbers of new fields and pays discovered, with a breakdown into oil, gas, and distillate fields and pays. Further tabulations by States give the numbers of oil, distillate, and gas fields, pays and extensions opened in 1946, with the footage of the wells, and an analysis of the dry tests according as they were wildcats, new pay tests, or outposts. G. D. H.

**1537. Wildcatting Success Below Average Ratio.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 136.—During 1946, 9·8% of the strict wildcats drilled in U.S.A. were successful. The percentage success for the 10 years 1937–1946 was 10·8.

A table gives by States and districts for 1946 and 1937–1946 the numbers of strict wildcats and productive wildcats, and the total numbers of wells completed in U.S.A.

G. D. H.

**1538. U.S. Crude Reserves Reach All-time Peak.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 139.—U.S. oil reserves were estimated to be 21,287,673,000 brl on January 1, 1947.

At the beginning of 1946, the figure was 20,826,813,000 brl. During 1946 new reserves proved amounted to 2,192,749,000 brl.

Tables give the proved reserves at the end of each year from 1936, with the ratio of reserves to annual production for each year, the new reserves proved and the production during each year from 1937, the proved reserves at the beginning and end of 1946, and the 1946 production by States and districts. G. D. H.

**1539. Salient Data on Productive Exploratory Wells Completed in U.S.A. in 1946.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 200.—The U.S. 1946 productive exploratory completions are listed by States with the following information : name, County, field, company, location, date completed, total depth, completion depth, name, character, and age of producing formation, initial production, choke, and oil gravity.

G. D. H.

**1540. January Exploratory Drilling Rate High.** Anon. *Oil Wkly*, 24.2.47, **124** (13), 61.—414 exploratory wells were completed in U.S.A. in January 1947, and 71 were successful. 52 discovered new sources of oil and 5 extended production. The main discovery appeared to be Howard 1, in Garvin County, Oklahoma. This well, lying in the Anadarko basin, is reported to have flowed 1000–2000 brl/hour before being checked.

A table summarizes the results of the January exploratory completions, by States and districts. A further table compares the overall results with those for January and December, 1946, while the January 1947 discoveries are listed with some details.

G. D. H.

**1541. A.P.I. and A.G.A. Oil–Gas Figures.** Anon. *Oil Wkly*, 10.3.47, **125** (2), 38.—The A.P.I. estimated U.S.A. crude reserves to be 20,873,560,000 brl, in addition to 3,321,027,000 brl of natural gas liquids.

Tables summarize the A.P.I. reserve estimates for each year since 1937, giving the production, reserves added through revision and extensions, and through new pools for each year, in addition to the total reserves. Similar data for 1946 are given by States.

G. D. H.

**1542. Peak Wildcatting Gain Despite Shortages.** Anon. *Oil Wkly*, 31.3.47, **125** (5), 58.—369 wildcats were completed in U.S.A. in February, and 76 were productive. Oil discoveries numbered 47, gas discoveries 6, and distillate discoveries 9. Extensions were made to 14 fields.

The Concord Central field, White County, Illinois, may be Illinois' best find in February.

Tables summarize the results of February's wildcat completions, both by States and by types. The February discoveries are listed with information on outstanding points. G. D. H.

**1543. Five Major Fields Needed to Maintain Reserves.** C. J. Deegan. *Oil Gas J.*, 26.7.47, **46** (12), 187.—About 15,000 oilfields are believed to have been found in U.S.A., but those with reserves exceeding 100,000,000 brl total only 105. These major fields have 63% of the proven reserves and accounted for over 50% of the output in the first half of 1947. Omitting East Texas, the average size of a major field is about 250,000,000 brl.

The maintenance of reserves requires the discovery of about 2,000,000,000 brl of oil in 1947, and if 60% of the past production has come from the major fields, new discoveries of the latter type should have reserves of 1,200,000,000 brl—the equivalent of five average major fields.

About 5000 exploratory tests are planned, but of these 1500 may be extension tests. In 1945–46 15% of the new field tests succeeded, and hence if the same success ratio holds, 525 fields of all sizes should be found in 1947. If 1% of these are major fields, there is the prospect of obtaining the requisite 5 major fields.

As the oil requirements rise major discoveries will be needed.

38 major fields (reserves exceeding 100,000,000 brl) were found in 1921 ; and in succeeding 5-year periods up to 1940 the figures were respectively 13, 21, 12, and 16,

A table lists the major fields with the date of discovery, estimated ultimate output, cumulative production, remaining reserve, production in first halves of 1946 and 1947, and age of producing horizon. G. D. H.

**1544. Light Oil Strike Near Santa Maria.** Anon. *Oil Gas J.*, 28.6.47, **46** (8), 163.—A well in 4-8n-33w, in the Santa Maria district of Santa Barbara County, California, has flowed 314 brl of 36·6° A.P.I. oil from the Miocene at 4805–4830 ft. A cluster of fields round this strike produce lower gravity oil. The well is 1½ miles southeast of Orcutt. G. D. H.

**1545. Pemex Producer.** Anon. *Oil Wkly*, 17.3.47, **125** (3), 29.—There are indications that a well completed in a new area in the northern part of the State of Veracruz will be a satisfactory producer. G. D. H.

**1546. Indiana's Output.** H. H. Nowlan. *Oil Gas J.*, 6.9.47, **46** (18), 66.—The southwestern part of Indiana lies in the Illinois basin. Ten pay horizons are present and wells cost $5000–$25,000. Numerous wells drilled 30 years ago still produce 5–10 brl/day, at depths less than 1500 ft. At Mount Vernon 24 wells have averaged 119,000 brl each since 1941, while at New Harmony 33 wells have averaged 105,000 brl each from eight pays.

The pools in this area are small and the sands are commonly lenticular. Oil is obtained from Pennsylvanian, Mississippian, and Devonian beds.

A map shows the producing areas, and a composite electric log section indicates the producing horizons. A table lists the more recently discovered pools, with the number of wells and pay zones, daily, cumulative, and estimated ultimate production.

G. D. H.

**1547. Delhi—Biggest Stratigraphic Trap Since East Texas.** G. Weber. *Oil Gas J.*, 14.6.47, **46** (6), 108.—The Delhi–Big Creek production has passed 10,000,000 brl in 2½ years. The field is in Louisiana on the southern edge of the Monroe uplift. The discovery well was drilled in 1944 and found oil production in the Holt sand of the Paluxy at 3280–3290 ft. A series of producing sands were found in a belt some 18 miles long. 331 wells have been drilled. Daily production is 25,000–30,000 brl.

The uplift of the Monroe Uplift–Sharkey Platform began at the end of the Lower Cretaceous and continued into early Tertiary times. The basal Tuscaloosa, Paluxy, and Upper Glen Rose beds were truncated and the impervious Monroe was laid on them. The Barrier sand connects various truncated Paluxy beds. In general, production is limited to the north by truncation, to the south and east by water, and to the southwest and west by lensing. Active water-drive exists in the Holt–Bryan. Ultimate recovery may be 200,000,000 brl.

Data are given on drilling costs and on the characteristics of the main reservoirs.

G. D. H.

**1548. Lithology and Thickness of the Traverse Group in Michigan Basin.** G. V. Cohee. *Oil Gas J.*, 5.7.47, **46** (9), 90.—Most of the oil produced in southwest Michigan has come from the Traverse group, and some Traverse production has been obtained elsewhere, especially in the central basin area.

The Traverse group is thickest in the area of Saginaw Bay, being about 875 ft. Southwards it thins to less than 100 ft in southwestern Berrien County. Part of this thinning is due to the absence of the Bell shale and Squaw Bay limestone.

There is thinning over major anticlines, suggesting movement in Traverse times. The centre of the basin is 3500 ft lower than the Traverse outcrop; the average dip being 38 ft/mile. The Traverse structure conforms with that of the Dundee–Rogers City, and in the centre of the basin are dominant northwest–southeast folds. In the southwest there are also north–south and northeast–southwest folds. The majority have over 100 ft of closure with oil only in the upper 40–60 ft.

Production in southwest Michigan is from porous dolomite overlying or associated with the uppermost chert layer in the uppermost part of the Traverse limestone. The thickness is 3–8 ft. In some areas there is a second slightly deeper producing horizon.

A map gives stratum contours on the top of the Traverse. The Traverse producing fields are noted and oil and gas possibilities are discussed. G. D. H.

**1549. Brookhaven Field.** N. Williams. *Oil Gas J.*, 14.6.47, **46** (6), 94.—The Brookhaven field of Lincoln County, Mississippi, now extends over an area 6 miles from north to south and 2–3 miles from east to west. There is a central " bald " area of 1000–1200 acres. The field is not yet fully defined.

66 producing wells and 13 dry holes have been drilled. Up to May 1947 the production was 2,512,650 brl. In January production exceeded 14,000 brl/day.

There is an elongated anticline, possibly over a deep salt swell. Some faulting is present. Production is from the lower part of the Tuscaloosa at depths of 10,138–10,541 ft. Closure is 429–517 ft. There are three main producing zones, but sands wedge out frequently. Effective sand thickness averages 30–35 ft. Permeability ranges 0–2700 m, and is irregular. Original reservoir pressure is estimated to have been 4600 p.s.i. and the bubble point is 2200 p.s.i. The abandonment pressure may be 320 p.s.i. The recoverable reserve may be 45,415,000 brl. Gas injection may be undertaken to enhance recovery by maintaining pressure above 2200 p.s.i. Gas might be purchased from Gwinville, 35 miles to the northeast. Pressure maintenance might give a recovery of 64,212,000 brl.

Brief notes on the early development and information on drilling are given.
G. D. H.

**1550. Sohio's 1 Howard.** F. H. Willibrand and D. L. Hyatt. *Oil Gas J.*, 12.7.47, **46** (10), 67.—1 Howard was spudded in November 1945 and completed at a total depth of 10,234 ft in January 1947. It is on the Eola structure, a minor fold adjacent to the Arbuckle Mountain front in Oklahoma, and is narrow. Permian to Ordovician beds were penetrated. Low-gravity oil was noted in the Pontotoc, a fair show was seen in the Hunton. 4 oil sands were met in the Bromide member of the Simpson Group. On a 1⅛-in choke production at the rate of 100 brl/hr was obtained from the Bromide, with a G.O.R. of 1000 cu. ft/brl. The oil gravity was 40° A.P.I.

Details of drill-stem tests and notes on the drilling are given. G. D. H.

**1551. Carthage Gas Field Development.** F. K. Foster. *Oil Wkly*, 23.12.46, **124** (4), 33.—The Carthage field of Panola County, Texas, was opened in 1936. The discovery well was completed in the Hill zone at 4880–4890 ft. Succeeding wells obtained gas in the Lower Pettit and Travis Peak. In 1943 a well gave 112,000 M.c.f. from the Upper Pettit and 79,000 M.c.f. from the Lower Pettit.

The beds penetrated range Wilcox (Eocene) to Smackover (Jurassic). The formations are described. There is an elongated dome. The four producing horizons are at depths of 4800 to 6440 ft, the Upper and Lower Pettit being most prolific.

The Hill zone produces over 16,000 acres and has a fairly even permeability. The Upper Pettit is more variable and shows variation at different levels, and the same is true of the Lower Pettit. Both are oolitic. The Travis Peak is sand with some silt, and as many as 8 separate producing sands have been noted.

The field extends over 300,000 acres, but is not fully defined on the east. Permeabilities are generally low and it is doubtful whether 1 well to 640 acres will give adequate drainage. It is considered to be the largest gas condensate reserve in U.S.A. A few wells have produced some oil, but oil wells seem unlikely to occur. Several wells on the west have found water directly below the gas. One well has found salt.

Structure and isopachyte maps are included, and all the wells are listed with depths, initial outputs, etc. G. D. H.

**1552. Western Delaware Basin Oil Possibilities.** R. R. Wheeler. *Oil Wkly*, 24.3.47, **125** (4), 22.—Surface structures in the Delaware basin of West Texas and southwest New Mexico are at times non-tectonic in origin, but due to solution or secondary distortion in the Permian evaporite series. Moreover, the evaporites have made seismic work difficult. Closed structures are rare and poor recoveries have been obtained from the Delaware sand section.

The west flank of the Delaware basin has in the east an area obscured by Late Permian evaporites, and in the west outcrops of the Delaware Mountain group. The latter is easily mapped, but the former is difficult, and only gravity or magnetic work seem suitable for locating structure.

The Delaware Mountain group consists of sandstones of variable porosity, interbedded with rich organic shales and limestones. There may also be pre-Permian oil objectives in this area, including the Simpson and Ellenburger. The Lower Delaware tends to be coarser than the Upper. Source rocks are plentiful.

Mapping has revealed little but anticlinal noses, at times closed by cross-faults. There may be a large structure on the projection of the Huapache Arch arch.

The Permian rests on bevelled Ordovician to Pennsylvanian rocks, and the later Permian lies on tilted and locally truncated early Permian.

The Huapache flexure shows signs of renewed movement. Repeated eastward tilting is indicated. Lensing and stratigraphic trap possibilities are indicated in the Delaware sequence, and these may lie in the basinward flank of the continuation of the Huapache trend. Closed folds may exist in pre-Permian oil objectives.

Oil seeps occur along Delaware Creek. G. D. H.

**1553. Trends in Petroleum Geology of the Gulf Coast.** M. T. Halbouty and G. C. Hardin. *Oil Gas J.*, 31.5.47, **46** (4), 136.—During 5 years following the discovery of Spindletop 29 domes were discovered in the Gulf Coast area, and up to 1924 there were 47 discoveries. From 1924 to 1933, 74 domal structures were found by geophysics. The earlier discoveries were associated with shallow piercement-type salt masses; the later discoveries were over deep-seated salt intrusions. In the past 10 years fields connected with faults have been more prominent.

The area has been very thoroughly explored geophysically, and practically all shallow geological and geophysical prospects have been drilled. A prolific source of relatively shallow production is the flanks of piercement-type salt domes where pinch-outs and unconformities provide traps.

Deeper drilling will be necessary to open many future discoveries in the Gulf Coast area. There are indications that while the cost of drilling exploration tests has risen, the chances of discovering new fields have decreased. Many of the deeper discoveries of recent years have not been of major importance. Most of them had small proven areas and high gas/oil ratios.

The deep Frio and Hackberry trends offer considerable possibilities for finding new fields. Attention is also being paid to the Wilcox–Yegua trend.

Salt domes are likely to occur offshore. G. D. H.

**1554. Offshore Development in Gulf Coast Promises to be Well Under Way by End of 1947.** E. H. Short. *Oil Gas J.*, 31.5.47, **46** (4), 228.—A steel-drilling platform is now being built 29 miles offshore in the Gulf of Mexico. About 10 years have elapsed since the first well was drilled in the Gulf proper, but at low tide the water was only 13 ft deep. 10 wells were drilled from one platform to give the Creole field.

Early geophysical work in the Gulf did not extend more than 3 miles offshore, but in 1944 work was carried out to 26 miles, and now over 50 miles has been reached.

All leases taken so far are well on the shore side of the 10-fathom line.

The State of Texas will offer 5760-acre blocks beyond the 3-miles limit to 27 miles out. G. D. H.

**1555. Another East Texas County Produces.** Anon. *Oil Gas J.*, 21.6.47, **46** (7), 139.—A well in San Augustine County, 3¾ miles north of San Augustine and 1 mile west of Bland Lake, has found oil in the Pettit zone of the Glenrose. 42° oil is produced at the rate of 85–100 brl/day on a $\frac{5}{32}$-in choke from 8130–8160 ft. Acidization improved the production rate. G. D. H.

**1556. Unusual Geology with Multiplicity of Pay Zones, Features South Haldeman Field.** C. J. Deegan. *Oil Gas J.*, 23.8.47, **46** (16), 91.—South Haldeman field, Jim Wells County, Texas, was opened in February 1947. It is west of Seeligson and associated with the regional Sam Fordyce–Vanderbilt fault zone. South Haldeman is a horst. The producing sands are more or less lenticular as at Seeligson, and are in the Frio and Vicksburg at depths of 4200–5600 ft. Outputs in the 4 wells completed range 54–216 brl/day, and the oil gravities are 40–48° A.P.I. Gas/oil ratios range 338 to 912 cu. ft./brl. The proven reserve is estimated at 10,000,000 brl.

A map and reduced electric logs are included. G. D. H.

**1557. Union Oil Plans Large Programme of Exploration in Washington State.** Anon. *Oil Gas J.*, 3.8.47, **46** (17), 64.—Union Oil Phoebe Parker *et al* was completed at 1912 ft in a badly faulted formation, and was dry. A second test is under way at Oyehut, Grays Harbor County, ½ mile from the Pacific.

Union has leased 200,000 acres in W. Washington. The area has Oligocene and Lower Miocene organic shales, and some high-gravity oil has been produced from Miocene and Oligocene beds on Hoh River, on the western side of Olympic Peninsula. There are odours of gas at many points from Gray's Harbor to near Cape Flattery. Ten tests are planned. Two in Oyehut area will be 2000 ft and 3000 ft deep.

G. D. H.

**1558. Expanding Frontiers of Natural Gas in West Virginia.** D. B. Reger. *Oil Wkly*, 20.1.47, **124** (8), 36.—Oil and gas were first found in West Virginia in salt borings near Charleston in 1808 at a depth of 58 ft. The subsequent history of natural gas production in this State is described briefly. In 1917 the output reached a peak of 308,617,101 M.c.f. Production was largely from the sands of the Pottsville, Pocono, and Catskill series, as well as from Chemung. The output fell and was 100,540,000 M.c.f. in 1932. In 1933 and 1934 oil and gas were obtained from the Oriskany northeast of Charleston at depths of about 5000 ft. This led to renewed activity and the completion of a few big wells on sharply folded mountain anticlines.

The Newberg sand of the Silurian has given some gas in western Wayne County and northern Boone County. A well in western Roane County reached the top of the Trenton at about 9000 ft.

Gas production reached a new peak of 223,787,000 M.c.f. in 1943. The lateral expansion of production since 1930 and the prospects of deeper developments are discussed.

A map shows the oil and gas areas, and a table gives the stratigraphic sequence with the thickness and producing sands. G. D. H.

**1559. Future of Oil in W. Virginia.** P. H. Price, R. C. Tucker, and J. H. C. Martens. *Oil Gas J.*, 16.8.47, **46** (15), 104.—Oil was first produced in W. Virginia in 1860 and the peak year's output of 14,000,000 brl was reached in 1901. Production has been obtained from more than 20 sands, the most important being of Upper Devonian and Lower Mississippian age, but there has been Pennsylvanian production. The fields are in the northern and western part of the State. Proved reserves at the end of 1946 were estimated at 35,655,000 brl and cumulative production was 432,706,000 brl. Further oil should be recoverable by water-flooding, and this is not included in the above estimate.

Almost all production has been shallower than 4000 ft. Deeper horizons cannot be considered to have been adequately tested, and these offer possibilities. The prospects of certain horizons and areas are discussed. G. D. H.

**1560. Full-Scale Exploration Under Way by Navy in Alaska.** C. O. Willson. *Oil Gas J.*, 9.8.47, **46** (14), 62.—During June 2 wildcats were spudded in Naval Reserve No. 4, one at Umiat and one at Cape Simpson. 1 Umiat, completed in 1946 and drilled to 6005 ft, had showings of oil at five depths. The second Umiat well is 5 miles east of the first, and structurally higher. A nearby shallow core hole has given a little oil. Four geological crews and two seismograph parties are operating.

The history of operations in this area is given. G. D. H.

**1561. Seeking Arctic Oil.** C. O. Willson. *Oil Gas J.*, 23.8.47, **46** (16), 78.—Many of the latest exploratory techniques are being employed in searching for oil in naval Petroleum Reserve, No. 4, in Alaska. Maps show the areas explored by surface geology, aerial photography, airborne magnetometer and gravity meter, surface gravity meter, and seismic work, and the fold trends and seepages. The area has 10,000–15,000 ft of Upper Cretaceous beds. The geology is briefly described, and there are brief notes on the geophysical work. A summary of formation test data on 1 Umiat, and the electrical log are given. G. D. H.

**1562. Liquid Bitumen Reserve Found.** Anon. *Oil Wkly*, 20.1.47, **124** (8), 29.—A liquid bitumen reserve of 400–500 million brl is reported to have been found on the west side of the Mildred–Ruth Lakes area, 20 miles north of Fort McMurray, Canada.

G. D. H.

**1563. Imperial Leduc 1 is West Canada's Best Producer Outside Turner Valley.** Anon. *Oil Wkly*, 24.2.47, **124** (13), 24.—Leduc 1, a wildcat 16 miles southwest of Edmonton, had an initial flow of 9000 brl/day of 36·7-gravity oil. A test of the Lower Cretaceous at about 4300 ft gave 6000 M.c.f./day of gas with a good show of light oil. At 5029 ft in the Devonian a porous limestone was met, and this gave oil and gas. This is the producing horizon; its gas/oil ratio is low. Leduc 2 is being drilled 1½ miles down the flank to the southwest.

32 miles southeast of Leduc 1, Wetaskiwin 1 is drilling below 5700 ft. G. D. H.

**1564. Sinclair Panama Starts Colon Island Wildcat.** Anon. *Oil Gas J.*, 23.8.47, **46** (16), 61.—A wildcat has been spudded on Colon Island, off Bocas del Toro, Panama. G. D. H.

**1565. Spring Hill 4 Test Runs Low.** Anon. *Oil Wkly*, 31.1.47, **124** (7), 31.—Spring Hill 4 in Chile is reported to be 65–70 ft lower structurally than No. 1. G. D. H.

**1566. Chile's Spring Hill 4 Abandoned; No. 5 Planned.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 262.—Spring Hill 4 was abandoned at 7479 ft, having reported shows, but having given no oil in drill-stem tests. Spring Hill 5 will be drilled 1100 ft southwest of No. 3. G. D. H.

**1567. Chile's Sixth Spring Hill Well Comes in a Producer.** Anon. *Oil Gas J.*, 28.6.47, **46** (8), 80.—The Sixth Spring Hill well is a producer, and the area is now estimated to have a production of 1600 brl/day. G. D. H.

**1568. Seventh Test Completed in Spring Hill Field.** Anon. *Oil Gas J.*, 6.9.47, **46** (18), 45.—Spring Hill 7 (Chile) has been completed, but no flow test has been made. No. 8 is about 5000 ft deep. G. D. H.

**1569. Tibu Cretaceous Production Enlarged by Colombian Test.** Anon. *Oil Wkly*, 23.12.46, **124** (4), 30.—K-12 on the southwest side of the Tibu field was drilled to 10,875 ft, and had showings just above the basement. The well was completed at 8732–8882 ft for 914 brl/day of 39-gravity oil on a ⅜-in choke. This well is several miles from the nearest production. K-28 on the northeast flank has been drilled to 10,327 ft, and is testing several horizons higher in the hole. G. D. H.

**1570. Tibu Cretaceous Testing Continues in Well K-28.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 262.—K-28 has been drilled to 10,327 ft, and the Cretaceous limestone is being tested, so far without very encouraging results because of tight formations. At several points flows of 40-gravity oil at the rate of 30–40 brl/day have been obtained K-21 on the southwest side of the Tibu field has flowed 43-gravity oil at 650–1500 brl/day. Best results have been obtained at 8600–8800 ft. K-21, drilled to 10,876 ft was Colombia's deepest test. G. D. H.

**1571. Exploration in Colombia Extends from Caribbean to Llanos.** K. B. Barnes. *Oil Gas J.*, 12.7.47, **46** (10), 44.—Expenditure on exploration work in Columbia during the past few years have probably exceeded $100,000,000.

The El Dificil field, 50 miles southeast of Barranquilla, produces from an Upper Oligocene limestone at about 5800 ft. The present potential of the field is about 2500 brl/day. High-pressure gas has been encountered in the Pinto area. At El Tablon a well has found gas.

A tightly folded anticline has been outlined by nine shallow tests at Floresanto. Two 75-brl 40-gravity producers have been obtained in the Middle Miocene. One is at 650 ft, the other at 1200 ft. The deep oil possibilities are being explored.

La Salina 1 was completed in Eocene sands at 1770–2230 ft for 75 brl/day of 21° A.P.I. oil. Highly fractured beds occur at Cantagallo where 3 fair and 2 small producers have been completed in addition to 2 gas wells and 5 dry holes. 1 Velasquez on the Teran–Guaquaqui property is reported to have a production of 421 brl/day from 6954–7120 ft. Other structures have been tested, and notes on these are given.

G. D. H.

**1572. Second Union Company Test is Commenced in Paraguay.** Anon. *Oil Wkly*, 10.3.47, **124** (2), 39.—The first Union test was abandoned at 7579 ft in January, and a second test will soon begin. G. D. H.

**1573. Peruvian Montana.** L. Ravitz. *Oil Wkly*, 3.3.47, **125** (1), 22 (International Section).—Three major oil companies are exploring the Peruvian Montana, but so far only one has found production. The seventh well at Ganzo Azul was completed in 1946 and flowed 3700 brl/day on test.

The activities in eastern Peru are briefly described. The Peruvian Government is preparing to drill at Santa Clara near Orellana on the Ucayali, while the Cia Puerana de Petroleo El Oriente is preparing to drill at Puerto Oriente, near Contamana.
G. D. H.

**1574. Pelayo Concession Well Completed as Producer.** Anon. *Oil Wkly*, 23.12.46, **124** (4), 30.—Tucupido 1, on the Pelayo concession, Venezuela, has produced 257 brl/day of 40·8-gravity oil on a ¼-in choke from 7473–7488 ft. G. D. H.

**1575. Vast Area in Middle East Awaiting Exploration and Development.** F. J. Fohs. *Oil Gas J.*, 19.7.47, **46** (11), 46.—Important oil deposits occur in northeast Iraq, extreme western Iran, and eastern Arabia, and will extend slightly into Turkey and Syria. Folds to the west in Syria, Lebanon, Trans-Jordan, and Palestine are principally in limestone beds without adequate cap-rock in most areas.

In Saudi Arabia is a primary oil reserve area of 221,000 square miles. The beds dip eastward from the Arabian foreland. Between the Zagros and Elbruz mountains in the northeast are less important basins. These are in northern Iran and southwest Afghanistan. Domes exposing Cretaceous beds are present, and the area may yield pools of the Rocky Mountain type. Other basins occur to the south in Iran and to the east in central Baluchistan.

16,000,000,000 brl of proven reserves exist in the Persian Gulf basin, and there is an indicated reserve of 26,500,000,000 brl. Expectations may be as high as 100,000–150,000 million brl.

The first-grade areas total 649,000 square miles; second-grade areas 131,000 square miles, and third-grade areas 195,000 square miles. There are 20 Middle East fields with 150 wells, and 3 pools in Egypt. During 1946 the daily production of the Middle East averaged 729,040 brl.

Russia has important oil reserves in sedimentary basins to the north. Including Sakhalin Russia's 1946 output averaged 454,794 brl/day. Russia controlled a further 120,289 brl/day. Russia's reserves may be 10,000,000,000 brl and the ultimate expectation may be 100,000,000,000 brl. G. D. H.

**1576. Egyptian Exploration Programme Most Intense.** H. Ozanne. *Oil Wkly*, 3.3.47, **125** (1), 10; 7.4.47, **125** (6), 3 (International Section).—The history of oil development in Egypt since 1880 is briefly described. Currently, production is about 30,000 brl/day from Ras Gharib and Hurghada. The former has produced 60,000,000 brl and the latter 28,000,000 brl.

At present concession terms are the subject of individual company negotiations. A short description of the activities of Anglo-Egyptian Oilfields, Ltd., is given, including notes on the Sudr discovery.

Socony-Vacuum's work in Egypt is described, together with that of Standard Oil Co. of Egypt. Lists of the wildcats drilled by the various companies are given.
G. D. H.

**1577. Haiti Wildcat.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 28 (International Section).—A wildcat in Haiti has reached 6500 ft. G. D. H.

**1578. Billion and Half of Reserves Added by Completion of Abqaiq No. 10.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 26.—Abqaiq No. 10 is over 2 miles west of previous production. It reported 220 ft of limestone with a porosity of 22% and flowed 11,000 brl/day on test. Saudi Arabia reserves are now estimated as Abqaiq 5,000,000,000 brl, Dammam 600,000,000 brl, Qatif 50,000,000 brl, and Abu Hadriya 140,000,000 brl.
G. D. H.

**1579. Hungary Plans to Exploit Gas–Oil Field Near Lispe.** Anon. *Oil Wkly*, 17.3.47, **125** (3), 29.—In 1946 oil and gas were discovered in the region of Igal, near Kaposvar, southwest Hungary. This area is to be investigated further.

A 7000 M.c.f. gas well has been completed at Ujudvari in the Lispe area.

G. D. H.

**1580. Gulf Affiliate to Test Salt Dome in Jutland.** Anon. *Oil Gas J.*, 19.7.47, **46** (11), 49.—An exploratory well is to be drilled near Holstebro, Jutland to test a deep salt dome. A wildcat in southwest Sweden showed some oil saturation, but was completed in a salt-water sand. G. D. H.

**1581. Small Show in Spain.** Anon. *Oil Wkly*, 23.12.46, **124** (4), 30.—A well in Burgos Province encountered a small show of oil at 750 ft. G. D. H.

**1582. Swedish Oil Discovery Official.** Anon. *Oil Wkly*, 31.1.47, **124** (7), 31.—Traces of oil have been found in a well drilled to 6230 ft at Hoellviken, Sweden. G. D. H.

**1583. Victoria, Australia.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 16 (International Section). —In 1924 a test at the head of Lake Bunga struck a water flow with traces of oil and some methane at 1070 ft. Metamorphics were met at 1200 ft. In 1926 a well 2 miles to the west found emulsified oil in glauconitic rock occurring at 1210–1272 ft. These were the first wells drilled in the Lakes Entrance area, where some 50 tests have been sunk, and most have had some oil shows. Total production is about a few thousand brl. The oil is in an Upper Oligocene glauconitic series, and in a lens some 10 miles by 2 miles, and appears not to have migrated. Almost all the oil produced has been emulsified. The deepest well was 3400 ft.

21 tests have been drilled in the Bengworden area, the depths ranging 1000–4000 ft, but none had showings. 40 tests have been drilled in the Longford area, 50 miles southwest of Lakes Entrance. None was deeper than 1500 ft. No shows were found in shallow tests drilled in the Dartmoor district. A 7305-ft. test near Glenelg had no shows.

Tables summarize the oil drilling carried out in Victoria. A map shows the areas in which drilling has taken place. G. D. H.

**1584. Oil Discovery Reported in Test on Cebu in Philippines.** Anon. *Oil Gas J.*, 19.7.47, **46** (11), 44.—Reports have been made of the discovery of oil in northern Cebu. Oil shows have been found at about 1600 ft and 8200 ft, but commercial possibilities are undetermined. The test is said to be over a fair-sized salt dome.

Late in 1941 an 8300-ft test apparently discovered oil sands, but the hole had to be plugged before a test could be made. G. D. H.

## Geophysics and Geochemical Prospecting.

**1585. Geophysical Prospecting and Petroleum Discovery.** J. McG. Bruckshaw. *Petroleum*, May 1947, **10**, 98.—This is the first of a series of six articles describing the various techniques employed in the geophysical exploration for petroleum.

F. W. H. M.

**1586. Magnetic Method of Geophysical Prospecting.** J. McG. Bruckshaw. *Petroleum*, June 1947, **10**, 122.—This second article in the series describes the use of the magnetic method. F. W. H. M.

**1587. Geophysical and Core Drilling Activity During 1946.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 240.—419 geophysical and core-drilling crews were active in U.S.A. at the end of 1946. 369 were geophysical crews, and of these 251 were seismic, and 95 gravity meter.

A table gives by States the numbers of each type of crew active on January 31, June 30, and December 31, 1946. G. D. H.

**1588. Unique Tripod Speeds Water Gravimetric Survey.** S. W. Woodward. *Oil Wkly*, 3.3.47, **125** (1), 50.—The tripod is a welded, braced, three-legged structure, with a plate on one side near the bottom, this plate causing the tripod to rise in the water when towed by the top. The height is about 17 ft, and it can be used normally with winds of 15 m.p.h. Trials have been made with a 26-ft tripod.

With stations 2600–3000 ft apart and good conditions gravity-meter readings can be made at 9–10-min intervals. Under typical Bahamas conditions the average time was 12 min made up as follows: 5½ min, travel between stations; setting up tripod 1 min; depth reading, setting up, and reading meter 3½ min; removing meter and preparing to move to next station 2 min.

Towing the tripod does not seriously reduce the boat's speed, and the tripod draws less water than the boat.

Photographs show the tripod in use. The tripod has been employed so far only where the sea floor is firm. G. D. H.

**1589. Portable Equipment Expedites Inland Marine Seismic Surveys.** A. B. Hamil. *Oil Gas J.*, 31.5.47, **46** (4), 146.—Portability of all equipment is essential in areas difficult of access. A brief description is given to the entire seismic recording equipment, including geophones and cables, which weighs only 250 lb and is easily carried by five men. A portable drilling unit is described. Equipment for drilling 50 holes, including fuel, tools, and bits, can be carried and operated by four men. Shooting and recording equipment is mounted in or on trucks in such a manner that it can quickly be removed when it has to be carried. G. D. H.

**1590. Principal Uses of Fluorologs.** O. E. Campbell. *Oil Wkly*, 30.12.46, **124** (51), 41.—Fluorologs are designed to determine the presence or absence of commercial oil accumulations ahead of the drill, or laterally from the well; to detect, and evaluate oil or gas shows in the well, and to permit the correlation of the rocks. It is considered that rocks overlying an oil accumulation show higher fluorescence intensities than those in barren territory. These higher intensities arise within 2000 ft of the surface.

Cuttings and cores are used in compiling fluorologs. The fluorescence intensity is measured photometrically. Wells which produce show fluorescence intensities of at least 0·25 ferg within 2000 ft of the surface. A value of 1·25 fergs indicates a definitely commercial zone. Observations are made on composite samples extending over 200 ft until a significant value is noted, and then the different parts are examined separately for detail.

Minute leakages of oil and gas are believed to cause the fluorescence.

In a multiple-sand field the fluorescence intensity increases again after a decrease below each sand. Dry wells just outside fields show high values on the free fluorescence curves (free fluorescence is due to free oil and gas in samples, fixed fluorescence is that associated with the rock).

The use and features of fluorologs are described and ideal core-hole fluorolog profiles are shown.

Samples taken at 30-ft intervals are suitable, and cuttings should be taken from the mud stream. 1-oz samples are suitable. G. D. H.

## Drilling.

**1591. New Drilling Method.** L. S. McCaslin, Jr. *Oil Gas J.*, 21.6.47, **46** (7), 108.—A description is given of a new type of drilling unit termed the Electrodrill which consists essentially of an electric motor which is geared to a circulation pump and a drill-drive shaft to which is attached a conventional type drilling bit, together with a bailer, a set of friction dogs, a junk basket and a swivel. The whole unit is lowered into the well on the power cable and is totally immersed in drilling fluid when drilling is in progress. The friction dogs bite into the sides of the hole and prevent rotation of the unit as a whole. The pump circulates fluid round the bit, which cuts in the conventional manner, whilst the fluid lifts the cuttings and dumps them in the bailer. The adaptability of this type of unit is discussed: one of the main disadvantages is the difficulty in preventing the sloughing of some formations into the hole owing to the absence of conventional mud circulation. The amount of hole that can be made without pulling the unit depends upon bit wear and the capacity of the bailer. The amount of sloughing is indicated by the amount of material in the junk basket.

A brief description is also given of a side-drilling unit, similar in operation to the Electrodrill. R. B. S.

**1592. New Drilling Technique.** A. Gibbon. *World Oil*, 7.7.47, **126** (6), 37.—See Abstract No. 1591 (1947).

**1593. Modern Practices in Deep Contract Drilling.** J. H. Abernathy. *Oil Gas J.*, 24.5.47, **46** (3), 87. (*Paper presented before Mid-Continent District, Division of Production, A.P.I., Amarillo, Texas,* Spring 1947.)—Trends in equipment developments and operating practices are discussed. The various equipment developments reviewed apply to: (1) derricks; (2) prime movers and pumps; (3) draw works; (4) transmission, compounding, and clutches; (5) drill-pipe; and (6) miscellaneous rig equipment (blocks, hooks, swivels, rotary tables, and drilling lines). The operating practices discussed are: (1) pump pressures; (2) hole size and table r.p.m.; (3) drilling weights and drilling collars; and (4) drilling mud. A summary of rig and bit performance compiled from data on several holes drilled to approximately 10,000 ft is also presented. R. B. S.

**1594. Modern Rotary Drilling. Parts 21–30.** J. Zaba. *Oil Gas J.*, 24.5.47, **46** (3), 111; 31.5.47, **46** (4), 271; 7.6.47, **46** (5), 99; 14.6.47, **46** (6), 129; 21.6.47, **46** (7), 117; 28.6.47, **46** (8), 147; 5.7.47, **46** (9), 103; 12.7.47, **46** (10), 103; 19.7.47, **46** (11), 95; 26.7.47, **46** (12), 289.—The sub-titles of Parts 21–30 of this series of brief articles on trends and developments in modern drilling practice are as follows: (21) Mechanical Transmission; (22) Hydraulic Transmission; (23) Hydraulic Torque Converter finds Increasing Application; (24) Electrical Power Transmission; (25) Developments in Electric Power; (26) Proper Control of Rate of Feed-off of Drilling Line; (27) Many Factors Affect Life of Wire Lines on Drilling Rigs; (28) Construction Methods of Wire Rope in Process of Evolution; (29) Deeper Drilling Resulting in Use of Heavier-Duty Wire Lines; and (30) Methods of Evaluating Service Expectancy of Wire Lines. R. B. S.

**1595. Drilling Difficulties Encountered in Olive Field.** T. H. Sandoz. *Oil Gas J.*, 31.5.47, **46** (4), 177.—The methods used in the Olive Field of Hardin County, Texas, in order to combat well kicking and thief formations are described. R. B. S.

**1596. Giant Barge Drilling Rig.** E. H. Short, Jr. *Oil Gas J.*, 31.5.47, **46** (4), 220.—A description is given of a unitized barge drilling rig in use in the Gulf Coast area. R. B. S.

**1597. Directional Drilling.** W. H. Cook. *Oil Gas J.*, 31.5.47, **46** (4), 232.—Recent trends in directional drilling on the Gulf Coast are briefly reviewed. R. B. S.

**1598. South Texas' Deepest Test.** N. Williams. *Oil Gas J.*, 7.6.47, **46** (5), 73.—A description is given of the conditions encountered in drilling the Texas Company's 16,006 ft well in Willacy County, South Texas. R. B. S.

**1599. Speed, Efficiency, and Safety in West Texas Rig.** G. Weber. *Oil Gas J.*, 5.7.47, **46** (9), 76.—The new features of a heavy rig recently placed in operation in the Permian Basin are described. R. B. S.

**1600. Trends in Drilling Equipment and Costs.** I. S. Salnikov. *Oil Gas J.*, 26.7.47, **46** (12), 220.—The trends in drilling methods and equipment, and in the costs of well drilling are discussed, and an analysis of the opinions of various contractors, etc., regarding future trends, is also presented. R. B. S.

**1601. Holding Up the Offshore Drilling Rig.** E. H. Short, Jr. *Oil Gas J.*, 28.6.47, **46** (8), 112.—The author discusses the various methods proposed for supporting offshore drilling rigs, as opposed to the piling platforms mainly used at the present time. The economies of offshore drilling operations are also considered. R. B. S.

**1602. A.C. Auxiliaries for Diesel–Electric Drilling Rigs.** J. N. Poore. *Oil Gas J.*, 12.7.47, **46** (10), 81.—The author discusses the economics and operation of both A.C. and D.C. auxiliary equipment, and suggests that there are several auxiliaries, such as blowers, pumps, and lights, which do not require the flexibility of D.C. power : in these cases some advantage may be gained by using A.C. power. R. B. S.

**1603. Troublesome Drilling Problems Solved by Special Muds.** G. R. Gray. *Oil Gas J.*, 31.5.47, **46** (4), 142.—The use of a specially treated starch additive for drilling in the Gulf Coast area is discussed. R. B. S.

**1604. Mud Pump Piston Lubrication.** Anon. *World Oil*, 7.7.47, **126** (6), 35.—The lubrication of mud pump pistons is briefly described. R. B. S.

**1605. Drilling Patent**. P. Marty. B.P. 590,098, 23.7.47. Boring tool holders with micrometric adjustment. G. R. N.

## Production.

**1606. Some Factors Affecting Success of South Texas Workovers.** H. N. Lyle. *Oil Gas J.*, 31.5.47, **46** (4), 130.—The need of accurate production and geological data in planning workover jobs is emphasized. The operating and economic practicability of workover jobs is then discussed under the following headings : (1) workovers within the producing reservoir ; (2) workovers in reservoirs penetrated by the well and cased-off ; and (3) workovers in deeper reservoirs within the practicable limits of deepening operations through an oil string of casing. R. B. S.

**1607. An Investigation of Errors in Bottom-Hole Pressure Measurement.** H. W. Perkins and P. E. Chaney. *Oil Gas J.*, 14.6.47, **46** (6), 102.—The method of analysing data obtained by tests on bottom-hole pressure measuring instruments is described, and examples of calculations are shown. Two references are appended. R. B. S.

**1608. Explosives Find Many Uses in Oil Production.** M. M. Kinley and J. Kinley. *Oil Gas J.*, 7.6.47, **46** (5), 83.—The many applications of explosives in the oil producing Industry are discussed, and the following conclusions are reached : (1) most explosives must be protected from pressure since no explosive operates as well under an initial pressure ; (2) the temperatures likely to be encountered are important—spontaneous detonation temperatures vary for different explosives, whilst they become more and more sensitive to shock as their spontaneous detonation temperatures are approached ; (3) most explosives must be protected from moisture ; (4) gun perforators must be so designed and constructed that they will not burst ; (5) debris left by shooting operations must not be such as to interfere with subsequent operations in the well ; (6) attention must be paid to lowering the shot through dense and viscous mud ; and (7) attention must be paid to constrictions, etc., in the hole insofar as the maximum diameter of the shot is concerned. R. B. S.

**1609. Gas Condensate Well Corrosion.** T. S. Bacon. *Oil Gas J.*, 26.7.47, **46** (12), 257. (*Paper presented before National Gasoline Association of America, Dallas, Texas.*)—The research work sponsored by the National Gasoline Assoc'n of America is reviewed. Four references are appended. R. B. S.

**1610. Corrosion in High-Pressure Gas Condensate Wells.** T. S. Zajac. *Oil Gas J.*, 21.6.47, **46** (7), 102 ; 28.6.47, **46** (8), 127.—The causes and characteristics of corrosion in gas condensate wells are discussed in the first part, whilst the detection and prevention of corrosion are discussed in the second part.

The most likely causes of gas condensate corrosion are carbonic acids, lower fatty acids, or both. Among other factors, the velocity of flow seems to have an appreciable effect upon the rate of corrosion ; the latter increasing with rate of flow. Detection of corrosion can be accomplished by regular inspection of christmas trees, tubing caliper surveys, coupon exposures, and effluent water studies. Prevention of corrosion can be accomplished by the use of various chemical treatments and the use of corrosion-resistant materials. The present state of knowledge in these fields is reviewed and some improvements are suggested. Twenty references are appended. R. B. S.

**1611. Development Programme in Brookhaven Field, Mississippi.** N. Williams. *Oil Gas J.*, 14.6.47, **46** (6), 94.—Difficulties encountered in producing oil from the Brookhaven field in Lincoln County, Mississippi, and the methods used to overcome them, are outlined. R. B. S.

**1612. Effect of Bacteria on Oil Production.** C. J. Deegan. *Oil Gas J.*, 21.6.47, **46** (7), 78; 28.6.47, **46** (8), 101.—The author reviews the present state of knowledge regarding Dr Zobell's discovery that certain strains of bacteria seem to have the power of releasing oil from sand grains. Research work on the practical application of this discovery has been commenced by the Penn Grade Crude Oil Assoc'n, and the results of this work to date are discussed. Although no definite conclusions can yet be drawn the initial results are promising, but the need for further research is emphasized. R. B. S.

**1613. Oil Production by Remote Control.** W. S. Stovell, Jr. *World Oil*, 7.7.47, **126** (6), 32.—A description is given of a remote control system which has been successfully used to operate 5 producing wells in the Catahoula Lake in Louisiana. R. B. S.

**1614. Pressure Maintenance Project Sets Pattern.** E. H. Short, Jr. *Oil Gas J.*, 5.7.47, **46** (9), 79.—A description is given of a recently completed pressure maintenance project in Coleman County, Texas, which is characterized by automatic controls. R. B. S.

**1615. Paraffin Removal.** E. F. Bowers and H. Renfro. *Oil Gas J.*, 31.5.47, **46** (4), 134.—The paraffin removal practices employed in South Texas are reviewed. R. B. S.

**1616. Determination of Oil and Connate Water in Place.** W. A. Bruce and H. J. Welge. *Oil Gas J.*, 26.7.47, **46** (12), 223. (*Paper presented before Mid-Continent District, Division of Production, A.P.I., Amarillo, Texas*, May 1947.)—A description is given of the new "restored state" method for determining oil and connate water saturation. The technique is based on simulating the pre-production history of the reservoir by forcing oil into a water saturated core from the producing sand. The external pressure required to do this is a measure of the capillary pressure between the oil and water phases. As this external pressure, and hence the capillary pressure, is increased, the water saturation is decreased until a certain minimum value of water saturation is reached. At this point further increases in external pressure produce no further reduction in water saturation. This minimum water saturation is believed to be equivalent to connate water saturation and the physical conditions within the core at the end of the experiment are an indication of the state of the reservoir before production is commenced. The exact significance of the results obtained and the facts to be borne in mind in interpreting them are discussed.

Nine references are appended. R. B. S.

**1617. Consolidation of Sands in Oil and Gas Wells.** G. G. Wrightsman and H. H. Spain. *Oil Gas J.*, 19.7.47, **46** (11), 73.—A new method of consolidating loose sands around a well bore, so as to prevent material sloughing into the hole, is discussed. This new method, which involves the use of plastics, obviates the necessity of using gravel packs or liners. R. B. S.

**1618. Effect of Thermal Changes on Natural Brine Densities.** H. A. Hoskings. *World Oil*, 14.7.47, **126** (7), 45.—A description is given of an apparatus for determining natural brine densities at various temperatures. Some results are given of density determinations at 10°, 15°, 25°, and 35° C and a small nomograph is constructed, based upon these results, showing the temperature–density relations of various gravity brines within this temperature range. R. B. S.

**1619. Haynesville Water Injection Programme Multiplies Expected Oil Recovery.** G. Weber. *Oil Gas J.*, 21.6.47, **46** (7), 80.—The development and production history of the Haynesville field in Louisiana and Arkansas is outlined. The water-injection operations, which were commenced in this field in March 1946, are also described. R. B. S.

**1620. Well Completion and Remedial Work with Plastics.** A. A. Townsend and R. H. Smith. *Oil Gas J.*, 10.5.47, **46** (1), 76. (*Paper presented before S.W. District, Division of Production, A.P.I., Fort Worth, Texas*, March 1947.)—The use of thermosetting plastics, combined with catalysts for controlling setting time, in well completion and remedial jobs, is discussed. The dump-bailer and tubing-squeeze methods of application are also described. R. B. S.

## Oilfield Development.

**1621. World Crude Production Showing Very Sharp Rise.** W. B. Hill. *Oil Wkly*, 10.2.47, **124** (11), 78.—During 1946 world oil output was 2,789,910,000 brl, 164,725,000 brl more than in 1945. U.S.A. produced 1,731,889,000 brl in 1946, Kuwait 6,900,000 brl, Saudi Arabia 60,500,000 brl, Venezuela 388,200,000 brl, and Mexico 49,212,000 brl. Russia's output is estimated to have been 160,000,000 brl.

Tables give the annual and average output each year from 1918, for the world, U.S.A., and the rest of the world, a comparison of pre- and post-war outputs by countries, with cumulative production to the end of 1946. A further table gives the annual output by countries from 1857. G. D. H.

**1622. Major Share of Foreign Wells in Latin America.** Anon. *Oil Gas J.*, 5.7.47, **46** (9), 61.—The world has about 486,543 producing oil and gas wells, of which U.S.A. has 452,000, and Latin American 19,847 wells.

A table gives data by countries on daily production, pumping and flowing wells, and rotary rigs in use. G. D. H.

**1623. Increase of 50% Seen in Global Oil Output, Excluding U.S.A.** W. W. Burns. *Oil Gas J.*, 26.7.47, **46** (12), 172.—An estimate of the 1947 output for the world excluding U.S.A. is 3,054,500 brl/day; the figure for 1946 was 2,764,500 brl/day. The predicted rate for 1951, again excluding U.S.A., is 4,654,500 brl/day.

It is predicted that Canada's output will be doubled by 1951. The Middle East production is expected to be more than doubled by 1951, and a six-fold rise is forecast for the Far East.

A table gives the output by countries for 1946, the estimated outputs for 1947 and 1951. G. D. H.

**1624. Completions Below October Total.** Anon. *Oil Wkly*, 30.12.46, **124** (5), 53.—2521 wells were completed in U.S.A. in November 1946 to give a total of 27,999 completions for the first 11 months of 1946. The November completions included 1259 oil wells, 26 distillate wells, and 286 gas wells.

A table summarizes the results of November completions by States and districts. G. D. H.

**1625. December Completions Top Previous Month's.** Anon. *Oil Wkly*, 27.1.47, **124** (9), 49.—2598 wells were completed in U.S.A. during December 1946 making the year's total 30,839. The 1945 total was 27,140. 15,961 oil wells, 3303 gas wells, and 207 distillate completions were made in 1946.

A table summarizes by States and districts the numbers of wells of different types completed in December, together with totals for November and December 1946 and for December 1945. G. D. H.

**1626. Cessation of Warfare Fails to Halt Upward Trend in U.S.A. Crude Oil Production.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 84.—During 1945 U.S.A. produced 1,711,103,000 brl of oil and during 1946 1,731,889,000 brl. The weighted average price paid to producers was $1.42 in 1946, 20 cents/brl more than in 1945. Oil stocks rose during 1946. Texas gave 758,858,000 brl in 1946, surpassing the 1945 figure of 755,553,000 brl. Output in Oklahoma and California in 1946 was below the 1945 level.

Tables give U.S.A. annual and average daily outputs yearly from 1918; the December production by States in 1941, 1945, and 1946; and the annual output by States from 1859, together with the average value per brl each year. G. D. H.

**1627. Few Fields Produce Big Daily Volumes.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 92.—At the end of 1946, 83 U.S.A. fields were producing over 10,000 brl/day. These fields gave 2,334,674 brl/day, almost half the U.S. output at the end of the year. East Texas gave 316,000 brl/day and Wilmington 117,667 brl/day. All the fields giving over 50,000 brl/day were in Texas and California.

A table lists the fields producing over 10,000 brl/day at the end of 1946, giving the discovery year, number of wells producing, daily output per well, and daily output of the field at the end of 1946. G. D. H.

**1628. Fifty-Seven Fields Have Had Big Yields.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 94.—57 U.S. fields have produced over 100,000,000 brl. Together they have given 15,009,625 brl out of 33,221,649,000 brl produced by the whole of U.S.A. to the end of 1946. The East Texas field has a cumulative production of 2,357,466,899 brl; Long Beach has given 721,598,105 brl.

The U.S. fields which have given over 100,000,000 brl are listed with the discovery year, 1945 and 1946 outputs, and the cumulative production to the end of 1946. G. D. H.

**1629. Peak Natural Gas Output is Forerunner of Further Gain.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 100.—It is estimated that 4,040,000,000,000 cu. ft. of natural gas was marketed in U.S.A. in 1946 (the 1945 figure was 3,875,000,000,000 cu. ft.). U.S. gas reserves were placed at nearly 148,000,000,000,000 cu. ft. at the beginning of 1946; 78,000,000,000,000 cu. ft. is in Texas. Texas produced 1,284,000,000,000 cu. ft. in 1946.

Tables give U.S. natural gas volumes marketed each year from 1918, and the number of gas wells; the gas production by States for the first 10 months of 1946, with classification as dry gas, sour gas, and oil-well gas; the estimated proved, recoverable gas reserves by States, with a break-down into gas dissolved in oil, free gas in oil reservoirs, and gas occurring alone; the gas marketed annually since 1906 by States and its total value. G. D. H.

**1630. U.S.A. Producing Oil Wells at Peak Level.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 106.—U.S.A. had 424,286 producing wells at the end of 1946. During the year 15,962 new oil wells were completed and 10,721 old wells were abandoned or shut in. 419,045 wells were producing at the end of 1945. The average daily output per well was 11·3 brl in 1946. 48,456 wells were flowing at the beginning of 1946, and 48,387 wells at the end of 1946. Texas had 102,759 producing wells at the end of 1946 and Pennsylvania 82,998 wells.

Mississippi has the largest average output per well, namely, 106·7 brl/day. Louisiana produced 51·6 brl/day/well, Texas 19·4 brl/day/well, and Pennsylvania 0·4 brl/day/well at the end of 1946.

Tables give the number of oil wells producing in U.S.A. at the end of 1945 and 1946, and the average daily output per well at the end of these years. G. D. H.

**1631. More Drilling Forecast for 1947.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 112.—30,221 wells were completed in U.S.A. in 1946, and 31,048 new wells may be drilled in 1947. 4830 wildcats are indicated for 1947. 101,010,551 ft was drilled in 1946; the 1947 figure may be 106,449,000 ft.

A table gives by States the wells drilled in 1946, the wells forecast for 1947, the 1946 footage and the estimated 1947 footage. G. D. H.

**1632. 1946 Completions Soar.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 114.—30,840 wells of all kinds were completed in U.S.A. during 1946. There were 30,221 new wells and 619 old wells deepened. Of the new wells 27,975 were drilled for oil and gas, and 2246 for salt water disposal, water or gas input. 19,472 productive wells were completed, 15,962 giving oil, 3303 gas, and 207 distillate.

Texas had 8226 new wells, Pennsylvania 4103, Oklahoma 3179, and Illinois 2342 wells. Oklahoma had a marked rise in input wells.

A table summarizes the U.S. well completions by years from 1918, giving oil, gas, distillate, water input, gas input, salt water disposal wells, and old wells deepened. A further table gives similar data by States for 1945 and 1946. G. D. H.

**1633. Sharp Increase Sends Footage Drilled to Near-Record Level.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 118.—During 1946, 101,010,551 ft was drilled in the U.S.A., a total footage exceeded only in 1937 (104,733,341 ft). The average depth of 1946 completions was 3342 ft. Texas had 35,848,363 ft of drilling and Oklahoma 10,157,773 ft in 1946. The average depth of completions in New York was 1407 ft, in Texas 4358 ft, and in Louisiana 6174 ft.

Tables give the number of wells completed, the total footage and the average depth per well yearly for U.S.A. from 1925; the numbers of wells, total footage, and average depth of each well completed for oil, gas, distillate, and dry wells, water input, gas input, and salt water disposal wells for each State in 1946. G. D. H.

**1634. Drilling and Producing Depth Marks Broken.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 122.—During 1946 the world's deepest well was drilled. Its depth was 16,668 ft and it lay in Kern County, California. The producing depth record was broken by a completion at 13,778 ft at Weeks Island, Louisiana.

10,000-ft wells have been drilled in 17 U.S. States, and 8 States have production below 10,000 ft. The deepest production in Missouri is at 1444 ft. Pennsylvania's deepest production is at 8625 ft.

The U.S. drilling and production depth records are listed with the depth, date, deepest formation reached, and well location. G. D. H.

**1635. Smaller Firms Drilled Three-Fourths of Wells.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 126.—7103 wells were completed in the U.S.A. by 37 of the larger companies in 1946; these companies drilled 1029 exploratory wells. Of 4206 strict wildcats, 797 were drilled by the larger companies, and these companies had 28·2% of the discoveries. On the whole the larger companies were less active in both types of drilling than in 1945.

A table gives the total and exploratory wells completed in 1946 by each of the larger companies, with a breakdown of the exploratory wells into types of discovery. G. D. H.

**1636. Fewer Rigs Running Than a Year Ago.** Anon. *Oil Wkly*, 10.2.37, **124** (11), 129.—Of 4644 rigs in operation in the U.S.A. on January 1, 1947, 2951 were rotaries. Texas had 1236 rigs, including 1086 rotaries, and Oklahoma 495 rigs.

A table lists by States and districts the numbers of rotary and cable tool rigs drilling, rigged up or shut down on January 1, 1947. G. D. H.

**1637. Producing Wells and Production in U.S.A. Oilfields.** Anon. *Oil Wkly*, 10.2.47, **124** (11), 154.—Tabulations are given which list the fields in alphabetical order under States, with the discovery year, numbers of flowing and artificial lift wells, the 1946 output and the daily output at the end of 1946, and the cumulative output to the end of 1946. G. D. H.

**1638. January Completions Slump.** Anon. *Oil Wkly*, 24.2.47, **124** (13), 65.—2281 wells were completed in U.S.A. in January 1947. 1135 found oil, 21 distillate, and 281 gas.

The drilling results are summarized by States and districts, and totals are compared with those for January and December 1946. G. D. H.

**1639. A.G.A. Estimates Reserves of U.S. Natural Gas.** Anon. *Oil Wkly*, 17.3.47, **125** (3), 30.—Proved recoverable reserves of natural gas in the U.S.A. at the end of December 1946 were estimated to be 160,000,000,000,000 cu. ft., made up of 116,000,000,000,000 cu. ft. in gas pools, 26,000,000,000,000 cu. ft. in gas caps, and 18,000,000,000,000 cu. ft. dissolved in oil. The reserves at the end of 1945 were 148,000,000,000,000 cu. ft. At the end of 1946 the recoverable liquid in natural gas was placed at 3,321,000,000 brl, of which 1,924,000,000 brl was in gas fields, 573,000,000 brl in gas caps, and 824,000,000 brl in dissolved gas.

Tables give by States the gas reserves at the end of 1945 and 1946, with the quantities in different categories, together with figures for the recoverable reserves of liquid in natural gas. G. D. H.

**1640. Completions Gain Despite Shortages.** Anon. *Oil Wkly*, 31.3.47, **125** (5), 58.—2365 wells were completed in the U.S.A. in February 1947. These included 1225 oil wells, 28 distillate wells, and 286 gas wells. There were 184 service wells or old wells deepened.

A table summarizes by States and districts the results of the February completions.
G. D. H.

**1641. U.S.A. Production Now Exceeding that of War Peak.** Anon. *Oil Gas J.*, 26.7.47, **46** (12), 174.—During the first half of 1947, the U.S.A. produced 894,776,000 brl of oil; the corresponding figure for 1946 was 848,516,000 brl and for 1945 869,802,000 brl (the previous record). The leading States in order of decreasing output are Texas, California, Louisiana, Oklahoma, Kansas, and Illinois.

The average daily output per well in the first half of 1947 was 12·4 brl.

Tables list by States the outputs of the first half of each year from 1940 to 1947, the average daily output per well and cumulative production. G. D. H.

**1642. 18,000 Wells, 68 Million Feet Seen for Last Half-Year.** C. J. Deegan. *Oil Gas J.*, 26.7.47, **46** (12), 176.—During the second half-year of 1947 more than 18,000 wells are expected to be drilled in the U.S.A., their footage aggregating 68,000,000 ft. More than 3000 wildcats are planned, making a total of nearly 5500 for 1947.

Tables give, by States and districts, forecasts of wells to be drilled during the second half of 1947; a comparison with drilling during the second half of 1946; drilling accomplished in the first half of 1947.

Brief notes are given on areas in which drilling activity is likely to be greatest during the second half of 1947. G. D. H.

**1643. Only Steel Shortage Prevented Record-Breaking Year of Drilling.** Anon. *Oil Gas J.*, 26.7.47, **46** (12), 180.—15,189 wells were completed in the U.S.A. during the first half of 1947. The average depth was 3510 ft. Shortage of steel cut down pipe for wells, and curtailed the building of pipeline outlets for production. The efficiency of drilling operations has risen since the war ended.

2399 wildcat wells were completed in the first half of 1947, 399 finding oil and 108 gas; the corresponding figures for development wells were 12,790, 7,984, and 1433 respectively. 1058 service wells were completed in the first half of 1947.

Tables summarize the well completion results by States and districts according as they are wildcats, development wells, or service wells. The fields with greatest drilling activity are listed. G. D. H.

**1644. The Gulf Coast Petroleum Centre.** R. J. Gonzalez. *Oil Gas J.*, 31.5.47, **46** (4), 124.—The Gulf Coast area has oil reserves estimated at 6,000,000,000 brl or over 30% of the U.S.A. reserves, and gas reserves of 60,000,000,000,000 cu. ft., which are equivalent to 10,000,000 brl of oil. There are 25,000 producing wells giving 1,275,000 brl/day. Gas-processing plants produce 82,000 brl/day. Refinery runs are 1,500,000 brl/day. Shipments total about 1,675,000 brl/day currently. The area has many deep and prolific fields. Some production is obtained from Mississippi and Florida.
G. D. H.

**1645. More than 500 Drilling Operations Now Under Way.** N. Williams. *Oil Gas J.*, 31.5.47, **46** (4), 166.—The Gulf Coast area, some 800 miles long and 100–150 miles wide has 369 fields which, up to March 1, 1947, had produced 4,323,370,000 brl of oil. The remaining reserve is estimated at 6,000,000,000 brl. During 1946 they produced 432,733,000 brl of oil, or about 25% of the U.S. output. 7 fields have produced over 100,000,000 brl each: 11 others have exceeded 50,000,000 brl each.

207 fields in coastal Louisiana have given an aggregate cumulative production of 1,163,693,000 brl.

Active exploration on the Gulf Coast has proceeded almost uninterruptedly since 1930, when geophysics came into extensive use. Before that date 89 fields had been found: since 1930, 780 fields have been opened, 229 having been found since 1942.

On May 1, 1947 there were 510 active drilling operations representing over 300 different fields and prospects.

Tables summarize discoveries by areas and years, and give the completions by months in 1947. G. D. H.

**1646. 12,000-ft Drilling.** N. Williams. *Oil Gas J.*, 31.5.47, **46** (4), 214.—In the Gulf Coast area production has been found at several places below 13,000 ft. The first 12,000-ft test was drilled in 1937 and in 10 years 224 such tests have been drilled, 51 of which have exceeded 13,000 ft.

The deepest test is 16,655 ft. 6 wells produce below 13,000 ft and 8 between 12000 ft and 13,000 ft. The deepest production is at Weeks Island, Louisiana.

The 51 wells deeper than 13,000 ft are in forty-two scattered areas. These wells are listed. Tables summarize the drilling deeper than 12,000 ft according to years and depths. G. D. H.

**1647. Gulf Coast's Fields Have Produced Nearly 6 Million Brl.** Anon. *Oil Gas J.*, 31.5,47, **46** (4), 243.—South Louisiana has produced 1,163,693,643 brl of oil up to March 1, 1947, from 3772 wells. Comparable figures for districts 1, 2, 3, and 4, of the Texas Gulf Coast are respectively 256,853,339 brl and 3155 wells, 401,908,531 brl and 3331 wells, 2,046,733,690 brl and 8111 wells, and 693,042,099 brl and 8700 wells.

Tables list the Gulf Coast Fields with name and location, discovery year, numbers of flowing and pumping wells, daily average production, cumulative production at March 1, 1947, depth to oil sand the name of the producing formation. G. D. H.

**1648. Production Almost Doubled Since 1941 in Southwestern Oklahoma.** C. J. Deegan. *Oil Gas J.*, 14.6.47, **46** (6), 99.—Since 1941 southwest Oklahoma's oil output has risen from 59,000 brl/day to 116,500 brl/day. Most of the increase has come from 14 fields developed principally since 1941. The developments have been north and south of the Wichita mountains, and in association with the Arbuckles.

Tables give the production rates yearly by countries and by leading pools, and the production rates of the leading companies in 1941 and 1947. G. D. H.

**1649. Crude Oil Production Sets All Time Record.** Anon. *Oil Gas J.*, 23.8.47, **46** (16), 69.—U.S.A. oil output averaged 5,165,175 brl/day during the week ended August 16, 1947. G. D. H.

**1650. Texas Co. Sets New World Depth Record for Producing Well—13,904 ft.** Anon. *Oil Gas J.*, 30.8.47, **46** (17), 54.—1 Lafourche Basin Levee District, in the Queen Bess Island area, Jefferson Parish, Louisiana, has been completed at 13,879–13,904 ft. 40·8° oil was produced at the rate of 48 brl/day with 6,188,296 cu. ft. of gas. The flowing pressure was 4200 p.s.i. and the total depth 15,523 ft. Total drilling time was 219 days.

The static bottom-hole pressure was 6234 p.s.i. and the closed-in tubing pressure 4830 p.s.i. The flowing bottom-hole pressure was 5685 p.s.i. for an output of 6,240,000 cu. ft/day on a $\frac{1}{4}$-in choke. The temperature at 13,877 ft was 242° F.

Some drilling and completion details are given. G. D. H.

**1651. Western Canada in Midst of Major Exploration Development Programme.** L. S. McCaslin. *Oil Gas J.*, 30.8.47, **46** (17), 71.—In February oil was discovered near Leduc 16 miles south of Edmonton. 788 brl/day of 36·7° crude was obtained from Devonian limestone at 5029–5066 ft. 8 producers in an area $1\frac{1}{2}$ miles by $3\frac{1}{2}$ miles have now been completed.

Canadian output has fallen from 10,643,000 brl in 1943, to 5,940,000 brl to date in 1947. The output is equal to about 10% of Canada's needs. Turner Valley output was 9,701,719 brl in 1942 and 5,937,362 brl in 1946.

In Colorado, Nebraska, Iowa, Wyoming, the Dakotas, and Montana the drilling of 15,600 test wells has proved 1,500,000,000 brl of oil, mainly in Montana and Wyoming. In Western Canada, which has the northern continuation of the sedimentary basin, 1600 test wells have proved about 164,000,000 brl of oil.

Leduc is the first area in the northern plains where a well has tested the Devonian. Production in East-Central Alberta was previously from the Cretaceous at depths down to about 2000 ft, except at Princess-Steveville where there is shallow Devonian production. Most production has been 14–25° A.P.I. oil, Three horizons in the Devonian at Leduc have been labelled productive or potentially productive.

Information is given regarding the companies operating in Canada and on their activities. G. D. H.

**1652. New Brunswick Field Development Planned.** Anon. *Oil Gas J.*, 16.8.47, **46** (15), 61.—Stony Creek has produced a little oil and gas since 1912. In 1946 it produced 28,500 brl to give an aggregate of 390,000 brl. Gas production has averaged 650,000 M.c.f./year. 148 wells have been drilled; 87 now produce.

Plans for further development are being considered. G. D. H.

**1653. First Quarter Mexican Crude Output Gains.** Anon. *Oil Gas J.*, 9.8.47, **46** (14), 61.—Mexico produced 13,084,193 brl of oil in the first quarter of 1947. The corresponding figure for 1946 was 11,178,142 brl. G. D. H.

**1654. Cuba 1946 Production Set at 268,000 brl.** Anon. *Oil Wkly*, 17.3.47, **125** (3), 29.—Cuba produced 268,000 brl of oil, including 68,000 brl of naphtha from Motembo. Jarahueca provided the remaining oil. G. D. H.

**1655. Brazil's November Output Continues to Show Decline.** Anon. *Oil Wkly*, 20.1.47, **124** (8), 29.—Brazil produced 8445 brl of crude in November making 61,454 brl for the first 11 months of 1946. Candeias produced 8123 brl in November. G. D. H.

**1656. Brazil Output Drops.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 32 (International Section).—Brazil produced 5790 brl of oil in December, making the 1946 total 67,144 brl. G. D. H.

**1657. All Five Brazil Fields Show January Production.** Anon. *Oil Wkly*, 24.3.47, **125** (4), 54.—Brazil produced 8798 brl of oil in January 1947, Candeias giving 7830 brl, Lobato 533 brl, Aratu 316 brl, Itaparica 111 brl, and Pitanga 8 brl. G. D. H.

**1658. Bolivia Output Down.** Anon. *Oil Wkly*, 24.3.47, **125** (4), 54.—Bolivia produced 346,109 brl of oil in 1946, and 406,114 brl in 1945. G. D. H.

**1659. Colombia Production for December Increases.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 32 (International Section).—In December the Casabe field gave 361,200 brl of oil. Tropical Oil Co produced 1,122,717 brl in December, and Colombian Petroleum Co 643,845 brl. G. D. H.

**1660. Modern Camps, Reservoir Control Feature Colombian Operations.** K. B. Barnes. *Oil Gas J.*, 5.7.47, **46** (9), 62.—A general account is given of oil operations in Colombia. The largest and oldest operations are on the De Mares concession. The newest area is Casabe on the Yondo concession.

Production at Petrolea is mainly from fractured Cretaceous limestones, and over 27,000,000 brl has been obtained. The Tibu structure is extensive and has large closure. The Barco sand is found at 4200–5200 ft, and Lower Cretaceous production at about 10,000 ft. G. D. H.

**1661. Ecuador Has Small But Lively Intergrated Petroleum Industry.** K. B. Barnes. *Oil Gas J.*, 30.8.47, **46** (17), 46.—First oil production by Anglo-Ecuadorian Oilfields Ltd, in Ecuador was obtained in 1920, and by 1925 shallow production on the Santa Elena Peninsula was 350 brl/day. In 1935 the output was 2,000,000 brl from the shallow Socorro sand. Since 1935 drilling to the Atlanta sandstone at about 4200 ft has maintained production at about 2,000,000 brl/year.

A refinery was built in 1937.

Oil from seepages on the Peninsula was used many years ago. The Peninsula has sporadic outcrops of dolerite and chert in the north, and in many places the beds dip steeply. Shallow wells in the cherty masses have produced oil commercially from fissures. To the south and southeast are the Seca and Socorro shales and sandstones of the Eocene, covered by Oligocene sands. Beneath the Socorro lies the "clay pebble bed" followed by the Atlanta sandstone.

There are about a dozen small oil pools, and some 600 shallow wells have been drilled. The Atlanta oil area shows no significant structure. Generally the sand is hard, dense, and impermeable, but in fissures and cracks over a vertical section of 1500 ft or more oil is found. Production has been found at depths ranging 2100 ft to 6200 ft.

Brief notes are given on drilling and on other aspects of the oil industry of Ecuador. G. D. H.

**1662. Peru Production.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 26 (International Section).—During 1946 Peru produced 12,455,991 brl of oil. G. D. H.

**1663. Successful Completions in Peru Show Little Change.** Anon. *Oil Gas J.*, 12.7.47, **46** (10), 43.—96 oil and gas wells were completed in Peru in 1946, 40 being dry. At the end of 1946 there were 2964 producing wells. G. D. H.

**1664. Peru—Oil Report.** K. B. Barnes. *Oil Gas J.*, 6.9.47, **46** (18), 46.—The Zorritos, Lobitos, and La Brea-Parinas oilfields lie in northwest Peru. Zorritos is government owned and produces about 300 brl/day from 50 pumping wells, 300–1700 ft deep. About 800 wells are operating in the Lobitos and Restin–El Alto area. Production comes from depths of 3000–6300 ft in the Eocene, and averages 6200 brl/day. La Brea–Parinas yields 28,000 brl/day from Tertiary sands at depths of 1500–5000 ft. About 2100 wells are active.

6 oil producers have been completed at Agua Caliente in Eastern Peru.

There are refineries at Lobitos, Zorritos, and La Brea–Parinas, as well as near Agua Caliente.

The operations of the different companies are described. G. D. H.

**1665. Venezuela Oil Production for 1946 Shows Increase.** Anon. *Oil Wkly*, 24.3.47, **125** (4), 54.—Venezuela produced 388,000,000 brl of oil in 1946. 651 wells, of which 562 gave oil and 7 gas, were completed in that year. G. D. H.

**1666. Venezuelan Production Shows Decline in April.** Anon. *Oil Gas J.*, 5.7.47, **46** (9), 61.—In March 1,159,763 brl/day of oil was produced in Venezuela and in April 1,143,950 brl/day. Over a quarter of the output came from Lagunillas. G. D. H.

**1667. Decline Indicated for High Venezuelan Output Rate.** Anon. *Oil Gas J.*, 12.7.47, **46** (10), 46.—During the first 4 months of 1947 Venezuela's output was 13·8% higher than for the same period of 1946. Daily output during the first 3 weeks of May averaged 1,107,016 brl/day. G. D. H.

**1668. Venezuelan Daily Production Shows Decline in May.** Anon. *Oil Gas J.*, 26.7.47, **46** (12), 159.—The daily production in Venezuela averaged 1,143,333 brl/day in April and 1,127,992 brl/day in May. G. D. H.

**1669. Mata Grande Production in Venezuelan Extended.** Anon. *Oil Gas J.*, 2.8.47, **46** (13), 43.—10 oil wells and a gas well now produce on the Mata Grande concession in eastern Venezuela. No. 16, the latest well, gave on test 300 brl/day of 33-gravity oil with G.O.R. of 400, from 4760 ft. The choke was $\frac{7}{32}$-in. G. D. H.

**1670. Maracaibo and Adjoining Areas World's Largest Producing Refining Concentration.** K. B. Barnes. *Oil Gas J.*, 2.8.47, **46** (13), 44.—The Bolivar coastal fields extend for about 50 miles along the eastern edge of the Lake, and produce 609,000 brl/day from 3092 wells. Other pools lie to the west, northeast, and southwest. La Paz has seven Cretaceous wells in addition to old, shallow Eocene wells. Mara has three Cretaceous wells.

Two refineries are being built, and two small refineries are built. Large refineries exist on Curacao and Aruba.

Wells have been drilled in 100 ft of water 10 miles out in the lake. G. D. H.

**1671. Eastern Venezuela—Status Report on Operations.** K. B. Barnes. *Oil Gas J.*, 23.8.47, **46** (16), 62.—Production in eastern Venezuela is mainly from Miocene sands. Multiple pay sands occur. The topography and history of oil developments in this area are described.

Currently eastern Venezuela produces 345,000 brl/day from about 1400 wells, most of which flow. Gas drive seems to be the dominant producing mechanism. Pressure maintenance is carried out in some fields. An experimental water-flood has been tried in the " B " segment of the $L_1$ sand at Oficina. There is a description of some recent plant installations. G. D. H.

**1672. Dutch Field Producing 2100 Brl Oil Daily.** Anon. *Oil Wkly*, 23.12.46, **124** (4), 30.—Coevorden is now producing 2100 brl/day from the Lower Cretaceous at 2500–2700 ft. 15 producing wells have been drilled in an area of 1900 acres. The structure is anticlinal and probably associated with a salt intrusion. The name has been officially changed to Schoonebeek. G. D. H.

**1673. German Oil Output.** Anon. *Oil Wkly*, 17.2.47, **124** (12), 16.—During the first 8 months of 1946 the oil production of the British zone in Germany was about 3,099,608 brl. G. D. H.

**1674. Five Tests Started in British Zone of Germany.** Anon. *Oil Gas J.*, 19.7.47, **46** (11), 45.—Five tests are now under way in the Zwischenahner district of Oldenburg.

The production of the British zone is about 12,600 brl/day and in 1946 the U.S. zone gave about 95 brl/day. G. D. H.

**1675. Soviets Emba Area Shows Increase in 1946 Over Pre-War.** Anon. *Oil Wkly*, 10.3.47, **125** (2), 39.—The Emba area produced 5,600,000 brl of oil in 1946. The pre-war annual output was 4,550,000 brl. Proved reserves are 280,000,000 brl, and production is expected to be 8,400,000 brl in 1950. Most production comes from the Jurassic, but the Cretaceous and Triassic also produce. Most fields are associated with salt intrusions, giving flank and cap oil. Dossor, Makat, Baitchunas, Iskin, Koschagil, and Schubarkuduk are the main fields. G. D. H.

**1676. Russia's Production : Argentina Plans Gas Line.** Anon. *Oil Wkly*, 24.3.47, **125** (4), 54.—Russia produced about 166,827,000 brl of oil in 1946. Argentina plans to build a gas pipeline from Comodoro Rivadavia to Buenos Aires. G. D. H.

**1677. A.I.O.C. Figures Show 1946 Output at 19,189,551 Tons.** Anon. *Oil Gas J.*, 19.7.47, **46** (11), 44.—During 1946, Iran production was 19,189,551 tons (the 1945 figure was 16,839,490 tons). 4,448,000 tons was produced in the first quarter of 1947.

The U.K. production was 55,387 tons in 1946 and 71,542 tons in 1945.

G. D. H.

**1678. Anglo-Iranian Production Shows Sharp Increase.** Anon. *Oil Gas J.*, 2.8.47, **46** (13), 43.—During April the Iran production averaged 411,933 brl/day.

G. D. H.

**1679. Haft Kel Leads Anglo-Iranian Production.** *Anon. Oil Gas J.*, 16.8.47, **46** (15), 61.—Iran production in 1946 was Haft Kel 8,750,448 tons, Agha Jari 4,065,739 tons, Masjid-i-Suliaman 3,674,797 tons, Gach Saran 1,879,096 tons, White Oil Springs 699,389 tons, Naft-i-shah 92,713 tons, and Pazanum 27,370 tons. G. D. H.

**1680. A.I.O.C.'s May Output at 378,800 brl Daily.** Anon. *Oil Gas J.*, 6.9.47, **46** (18), 45.—During May, Iran oil output was 1,525,000 tons, giving a total of 7,587,000 tons this year. G. D. H.

**1681. Japanese Oil Production Reported Falling Behind.** Anon. *Oil Wkly*, 20.1.47, **124** (8), 29.—In August 1946 Japanese oil production was 131,522 brl. A strike caused a drop to 98,539 brl in September. 708,175 brl were produced in the first half of 1946. G. D. H.

**1682. 10 Million Brl for Nederlands East Indies.** Anon. *Oil Wkly*, 3.3.47, **125** (1), 26 (International Section).—1946 oil production in the Dutch East Indies is estimated to have been about 1,300,000 metric tons.

British Borneo gave 35,000,000 brl. Tarakan is producing about 4000 brl/day.

G. D. H.

## Transport and Storage.

**1683. Corrosion of Buried Pipes.** Anon. *Petroleum*, June 1947, **10**, 133.—It is now well established that corrosion of a ferrous metal immersed in water occurs by an electrochemical mechanism. On a non-uniform surface, polarization by hydrogen of the tiny galvanic cells set up inhibits further corrosion. If, however, oxygen is available to act as a depolarizer, corrosion will continue.

Certain agents can depolarize anaerobically, among them being sulphate-reducing bacteria of which *Vibrio desulphuricans* is an example. This is a facultative autotroph and not a strict anaerobe and it has been found that iron is essential to growth.

An iron pipe buried in the subsoil under anaerobic conditions, *e.g.*, in heavy clay, will corrode if sulphate and this particular *Vibrio* are present, and this has been paralleled in controlled laboratory experiments.

A general theory of the reactions is advanced, but all parts of the hypothesis have not yet been tested.

F. W. H. M.

## Refinery Operations.

### Refineries and Auxiliary Refinery Plant.

**1684. Priming Centrifugal Pumps. Refiner's Notebook No. 156.** W. L. Nelson. *Oil Gas J.*, 9.8.47, **46** (14), 111.—Brief notes are given in connexion with the functioning of refinery centrifugal pumps. The notes cover: the necessity of venting, whether or not pumps are installed with a positive or " flooded " suction head; the use of steam (air or water) evacuators and foot valves, and their application. Evacuators and foot valves are seldom used on refineries for the reasons given. Refineries generally use a positive suction head, but so-called priming tanks are also used. A simple priming tank application is illustrated and its functioning described. The maximum suction lifts of pumps and method of computing it are described in the *Refiner's Notebook* No. 155 of 2.8.47.

W. H. C.

**1685. Vacuum and Close-Clearance Pumps.** W. L. Nelson. *Oil Gas J.*, 30.8.47, **46** (17), 103.—No. 159 in the *Refiner's Notebook* Series gives conditions for the optimum operation of vacuum and close-clearance pumps. Loss of suction due to vapour locking whilst handling a hot liquid is discussed and illustrated.

It is possible to operate with a positive suction head of only 4 ft when pumping 700° F boiling liquid with even 40% of fuller's earth at a pressure of 1-in of mercury in the suction vessel, but heads of 8 ft or more are recommended.

Reference is also made to *Refiner's Notebook* No. 155.

G. A. C.

**1686. Thermal Cracker Expanded into T.C.C. Unit at Leonard Refineries, Inc.** A. L. Foster. *Oil Gas J.*, 16.8.47, **46** (15), 78–82.—Exceptional interest has been directed to the functioning of the new thermofor catalytic cracking plant at Leonard Refineries, Inc., Alma, Michigan, owing to its being the first post-war small-scale unit and also on account of its development from a conventional thermal unit. A photograph, a flow sheet, and drawings, including three of special features, are given, and the installation is described. Some of the old equipment used, the 2 Unaflow coil heaters (ex Dubbs), the tar separating tower (Dubbs Flash Chamber), the synthetic crude tower, absorber and stabilizing columns, compressor, etc., have been slightly modified. The new equipment consists of the following: A top-suspended elevator, 153 by 6 ft in which the conveyor buckets have three compartments, the outside ones taking the spent catalyst to the regenerator hopper, the inner taking the regenerated catalyst to the reactor hopper. The buckets are fed respectively by a Y divided chute and a single chute, and are emptied by inversion at the top into similar chutes leading to their respective hoppers. The reactor is situated in a 12 ft dia column which contains three sections : (*a*) the hopper which feeds the reactor via a 49 ft by 11 in line through the second section, (*b*) which is the hot catalyst storage vessel, (*c*) the reactor is the lowest section. The catalyst distributor and a unique indicating level controller at the top of the reactor, and the catalyst and vapour separator at the bottom are described. The means provided for preventing the vapour passing into the hopper and to the regenerator at the bottom, are by inert gas at about 10 in water pressure above the reactor pressure (6–8 p.s.i.) and purge steam, respectively. The regenerating system comprises a kiln, 10½ ft by 58 ft, a flue gas stack, air-line burner, blower, and auxiliaries. The kiln is fed by a hopper through a distributor, and contains seven regenerating zones, each with cooling coils, air inlet channels near the vertical centres of the zone, and alternating with the air inlets are flue gas or collector channels leading to the stack. Lines from the elevator top and flue-gas stack lead to an elutriator and cyclone for the elimination of fines, and a line from the regenerator cooling coils passes through a cooling water system and provides steam. The constructional materials employed are discussed and typical operating details are given of running two Michigan reduced crudes. Several economies attained by the design are described ; a further economy was made by providing a simple barometric condenser, or direct water-contact unit instead of a conventional shell and tube exchanger, for condensing the overhead from the synthetic crude main fractionator. The plant was designed for 3000 brl/day, and has accomplished 5000 brl/day with good yields, and still promises more. The total overall cost was $250 brl/day throughput capacity. W. H. C.

## Chemical and Physical Refining.

**1687. Silicone Anti-Foam Agents for Lubricating Oils.** Anon. *Petroleum*, June 1947, **10**, 132.—The use of very low concentrations of certain organic compounds of silicon, particularly those in which the carbon atoms are directly linked, are claimed to be extremely effective in suppressing the foaming characteristics of lubricating oils, without adversely affecting the other functional properties of the oil. Data is given to support these claims. F. W. H. M.

## Special Processes.

**1688. Benzonitrile Produced on Semi-Commercial Basis.** Anon. *Oil Gas J.*, 9.8.47, **46** (14), 116.—A pilot plant has been erected at the Socony-Vacuum's Paulsboro refinery, New Jersey, U.S.A., for the production of benzonitrile from toluene and ammonia. These, in the presence of a catalyst, whose nature is not disclosed, react as follows : $C_6H_5CH_3 + NH_3 \rightarrow C_6H_5{\cdot}CN + 3H_2$. Benzonitrile has an especially high reactivity with a large number of chemicals which can be used for the synthesis of rubber, resins, plastics, pharmaceutical products, etc. Its application in these fields has so far been handicapped by the lack of adequate quantities. W. H. C.

## Refining Patents.

**1689. Patents on Refining Processes and Products.** C. Arnold (Standard Oil Dev. Co.). B.P. 589,861, 16.7.47. Polymerization of olefins.

Standard Oil Dev. Co. and J. C. Arnold. B.P. 589,868, 16.7.47. Gelatinous hydrocarbon conversion catalysts.

Shell Development Co. B.P. 589,915, 16.7.47. Production of mono-olefins from more highly unsaturated hydrocarbons.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 589,879, 16.7.47. Catalytic conversion of hydrocarbon oils.

Du Pont de Nemours and Co. and W. E. Hanford. B.P. 589,923, 16.7.47. Lub. compositions.

C. Arnold (Standard Oil Dev. Co.). B.P. 589,847, 16.7.47. Catalytic cracking.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,007, 16.7.47. Reactions in the presence of contact particles.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,192, 23.7.47. Low temperature polymers of olefins.

A. Abbey (Biggs Clarifier Co.). B.P. 590,214, 23.7.47. Dehydrating lub. oil.

C. Arnold (Standard Oil Dev. Co.). B.P. 590,106, 23.7.47. Manufacture of stable distillate fuel oils.

C. Arnold (Standard Oil Dev. Co.). B.P. 590,252, 23.7.47. Manufacture of spherical particles.

Standard Oil Dev. Co. and C. Arnold. B.P. 590,311, 23.7.47. Dehydration of ethyl alcohol.

Standard Oil Dev. Co. B.P. 590,455, 30.7.47. Isomerization of *n*-paraffins.

Standard Oil Dev. Co. B.P. 590,456, 30.7.47. Catalytic conversion.

Shell Dev. Co. B.P. 590,368, 30.7.47. Insecticidal and fungicidal compositions.

C. Arnold (Standard Oil Dev. Co.). B.P. 590,336, 30.7.47. Control of heat exchange between fluids.

Shell Dev. Co. B.P. 590,479, 30.7.47. Production of olefin oxides.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,338, 30.7.47. Catalytic conversion.

Universal Oil Products Co. B.P. 590,488, 30.7.47. Isomerization of liquid paraffins.

Shell Dev. Co. B.P. 590,490, 30.7.47. Production of alkyd resins.

Standard Oil Dev. Co. B.P. 590,492, 30.7.47. Production of alkylated aromatic hydrocarbons.

Du Pont de Nemours and Co. B.P. 590,381, 30.7.47. Catalyst compositions.

B. Hayter and J. L. Breese (Oil Devices). B.P. 590,531, 30.7.47. Liquid fuel burners.

Socony-Vacuum Oil Co., Inc. B.P. 590,425, 30.7.47. Continuous cyclic system for catalytic reactions.

Low Temperature Carbonization, Ltd., G. S. Pound, and S. R. M. Ellis. B.P. 590,635, 7.8.47. Refining of oils.

Standard Oil Dev. Co. B.P. 590,548, 7.8.47. Production of xylene.

Lummus Co. B.P. 590,590, 7.8.47. Styrene fractionation.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,595, 7.8.47. Polymerization of *iso*-olefins.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,597, 7.8.47. Separation of finely divided solids from gases by treatment with liquids.

Anglo-Iranian Oil Co. Ltd. (R. W. King). B.P. 590,554, 7.8.47. Counter-current treatment in two-phase fluid systems.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,613, 7.8.47. Production and separation of *tert*.-olefins.

C. Arnold (Standard Oil Dev. Co.). B.P. 590,616, 7.8.47. Polymerization of olefins.

Du Pont de Nemours and Co., C. H. Hamblit, and A. McAlevy. B.P. 590,571, 7.8.47. Reacting olefins with formaldehyde.

Standard Oil Dev. Co. B.P. 590,882, 13.8.47. Contacting finely divided solids and gaseous fluids.

J. W. Williams. B.P. 590,940, 13.8.47. Purification of contaminated machine oils.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,885, 13.8.47. Addition agents for petroleum oils.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,904, 13.8.47. Separation of powdered material from gases.

A. L. Mond (Universal Oil Products Co.). B.P. 590,905, 13.8.47. Separation of gaseous mixtures.

Du Pont de Nemours and Co. B.P. 590,816, 13.8.47. Ethylene polymers.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 590,868, 13.8.47. Stripping volatile material from solid particles.

F. J. Cleveland (Socony-Vacuum Oil Co., Inc.). B.P. 590,973, 13.8.47. Lub. oil compositions containing stabilizers.

Shell Dev. Co. B.P. 590,980, 13.8.47. Production and recovery of hydroaromatic *cyclo*paraffins.

Standard Oil Dev. Co. B.P. 590,994, 20.8.47. Lubricating greases.

Standard Oil Dev. Co. B.P. 591,101, 20.8.47. Operation of supercharged aviation engines.

C. Arnold (Standard Oil Dev. Co.). B.P. 591,137, 20.8.47. Interpolymers of rubber-like structure.

Shell Dev. Co. B.P. 591,078, 20.8.47. Production and recovery of hydroaromatic *cyclo*paraffins.

Shell Dev. Co. B.P. 591,037, 20.8.47. Application of finely divided contact materials.

Standard Oil Dev. Co. B.P. 591,399, 27.8.47. E.P. lubricants.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 591,358, 27.8.47. Separation and purification of alkyl halides.

J. G. Gaunt (Girdler Corpn.). B.P. 591,406, 27.8.47. Alkylation of *iso*paraffins with olefins in the liquid phase.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 591,417, 27.8.47. Hydrocarbon conversion.

C. Arnold (Standard Oil Dev. Co.). B.P. 591,248, 27.8.47. Production of tri*iso*-butylene.

Shell Dev. Co. B.P. 591,373, 27.8.47. Catalytic cracking.

Du Pont de Nemours and Co. B.P. 591,335, 27.8.47. Ethylene polymerization.

W. W. Triggs (N.V.I.H.M.). B.P. 591,347, 27.8.47. Desulphurization of petroleum distillates.

Shell Dev. Co. B.P. 591,348, 27.8.47. Piston assembly.

Standard Oil Dev. Co. B.P. 591,444, 3.9.47. Curing polymeric materials.

Shell Dev. Co. B.P. 591,543, 3.9.47. Production of ditertiary peroxides.

Universal Oil Products Co. B.P. 591,631, 3.9.47. Alkylation process.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 591,544, 3.9.47. Alkylation process.

Gulf Research and Dev. Co. B.P. 591,547, 3.9.47. Dealkylation of alkylphenols.

Akt. Separator-Nobel. B.P. 591,621, 3.9.47. Production of oils of low pour-point and mineral waxes of different melting points.

Lummus Co. B.P. 591,983, 17.9.47. Azeotropic distillation.

I.C.I. Ltd. B.P. 591,984, 17.9.47. Fuel containers.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 591,989, 17.9.47. Synthesis of gasoline.

C. Arnold (Standard Oil Dev. Co.). B.P. 591,903, 17.9.47. Silica gel catalysts.

Universal Oil Products Co. B.P. 592,088, 17.9.47. Conversion of gaseous olefins.

J. C. Arnold (Standard Oil Dev. Co.). B.P. 591,912, 17.9.47. Spherical form of alumina gel.

Shell Dev. Co. B.P. 591,915, 17.9.47. Coating compositions.

Shell Dev. Co. B.P. 592,116, 17.9.47. Preparation of stabilized alumina.

J. R. Bates and H. A. Shabaker, assrs to Houdry Process Corpn. U.S.P. 2,412,958, 24.12.46. Manufacture of a contact material from an inorganic gel.

E. Hene. U.S.P. 2,412,983, 24.12.46. Conversion of heavy hydrocarbons by passage over a molten surface.

G. B. Hatch, E. F. Pevere, L. A. Clarke, and F. H. Bruner, assrs to The Texas Co. U.S.P. 2,413,105, 24.12.46. An alkylation process.

R. A. Swenson, assr to Standard Oil Co., Indiana. U.S.P. 2,413,121–2, 24.12.46. Manufacture of mill greases.

J. M. Musselman and H. P. Lankelma, assrs to Standard Oil Co., Ohio. U.S.P. 2,413,188, 24.12.46. A salt of an organic oxysulphur acid is used as a lub. oil additive.

R. C. Taylor, assr to The Atlantic Refining Co. U.S.P. 2,413,199, 24.12.46. Manufacture of aliphatic hydrocarbon sulphonates.

J. C. Ward, Jr. and J. J. Sims, assrs to Phillips Petroleum Co. U.S.P. 2,413,205, 24.12.46. Ethylene glycol is used in the concentration by distillation of an aqueous solution of a hydrogen halide.

H. C. Reed and B. M. Holt, assrs to Union Oil Co. U.S.P. 2,413,245, 24.12.46. Azeotropic distillation of toluene.

R. I. Stirton, assr to Union Oil Co. U.S.P. 2,413,262, 24.12.46. An aviation gasoline which contains an amine, aromatic, and other hydrocarbons and lead tetraethyl.

H. R. Warrick, assr to The Texas Co. U.S.P. 2,413,271, 24.12.46. A catalytic cracking process.

H. S. Bloch, assr to Universal Oil Products Co. U.S.P. 2,413,310, 31.12.46. Recovery of hydrocarbons from aluminium chloride sludge.

C. A. Cohen, assr to Standard Oil Dev. Co. U.S.P. 2,413,311, 31.12.46. Removal of pepper sludge and $SO_2$ from an acid treated lub. oil by means of a filter aid followed by the formation of oil soluble sulphonates in the oil by the addition of a basic compound of a polyvalent metal.

R. M. Cole, assr to Shell Dev. Co. U.S.P. 2,413,312, 31.12.46. Desulphurization of a cracked gasoline in stages using hydrogen and a suitable catalyst.

J. M. Musselman, assr to Standard Oil Co., Ohio. U.S.P. 2,413,332, 31.12.46. The reaction product of a phosphorus sulphide and an oxygen containing wax is used as a lub. oil additive.

B. F. Hunter and H. P. Hobart, assrs to Gulf Oil Corpn. U.S.P. 2,413,353, 31.12.46. A cutting oil composition which contains a solvent extract.

L. Schmerling, assr to Universal Oil Products Co. U.S.P. 2,413,384, 31.12.46. Catalytic production of branched chain paraffins from an alkyl halide and *iso*paraffins.

H. Dreyfus. U.S.P. 2,413,407, 31.12.46. Cracking hydrocarbons in the presence of a diluent gas.

B. T. Anderson and M. T. Flaxman, assrs to Union Oil Co. U.S.P. 2,413,482, 31.12.46. A petroleum extract containing phenol homologues and naphthenic acids is added to a highly refined diesel fuel to enhance its lubricating quality.

D. L. V. Katz, assr to Phillips Petroleum Co. U.S.P. 2,413,503, 31.12.46. A high pressure absorption process for extracting gasoline from gas ex condensate wells.

G. R. N.

# Products.

## Chemistry and Physics.

**1690. Anaerobic Fermentation of Alkali-Metal Oleates ; Production of Petroleum.** J. Laigret. *Compt. Rend.*, 1947, **225**, 398-399.—In previous work the author had shown that a particular strain, A.5029 of *B. perfringens* formed large amounts of methane when grown in media containing alkali-metal formates. The same organism grown in a medium containing commercial-grade olive-oil soap produces carbon dioxide and a black combustible liquid which accumulates on the surface of the medium. Distillation of this gives a 15% fraction (163° initial b.p. to 300°), a 50% fraction (boiling range 300-350°), and 35% residual black tar which does not distil at 350° at atmospheric pressure. The fermentation process has been maintained continuously in 1-litre flasks, each yielding 3 g of crude liquid product per day from 4 g of soap.

The results indicate that petroleum is the product of a bacterial fermentation and that the geological process can be reproduced in the laboratory. The enzymes involved are produced by the anaerobic bacterium previously recognized as a powerful methane producer, but it is evident that it is also capable of synthesizing liquid petroleum hydrocarbons. G. H. B.

**1691. Structure of Ethylene Oxide and *cyclo*Propane.** J. W. Linnett. *Nature*, 1947, **160** (4057), 162.—Calculations of the force constants of ethylene oxide and *cyclo*propane from the Raman spectra and infra-red spectra indicate that the CH-links in these compounds approach those in ethylene, thus providing support for Walsh's formulæ (see Abstract No. 617 (1947)). H. C. E.

**1692. Formulæ for Ethylene Oxide and *cyclo*Propane.** R. Robinson. *Nature*, 1947, **160** (4057), 162.—Robinson's objections (Abstract No. 878 (1947)) to Walsh's formulæ (Abstract No. 617 (1947)) are based upon the symbols used. Argument is also directed against the similarity of reactions of ethylene oxide with those of ethylene. H. C. E.

**1693. Notes on Rate Process Theory of Flow.** A. Bondi. *J. Chem. Phys.*, 1946, **14**, 591.—For the purpose of predicting viscosity of liquids from first principles, the paper deals with the separation of the contributing terms of the energy and entropy of activation for viscous flow, and with the identification of some of the molecular constants which enter into these terms. J. T.

**1694. Infra-Red Absorption Spectra of Some $C_4$ and $C_5$ Dienes.** R. S. Rasmussen and R. R. Brattain. *J. Chem. Phys.*, 1947, **15**, 131.—The infra-red absorption spectra in the interval from 2 to 15 $\mu$ are given for 1 : 3-butadiene, 1 : 2-butadiene, isoprene and *cis*- and *trans*-1 : 3-pentadiene vapours. General features of these spectra are discussed. J. T.

**1695. Infra-Red Absorption Spectra of Some Octenes.** R. S. Rasmussen, R. R. Brattain, and P. S. Zucco. *J. Chem. Phys.*, 1947, **15**, 135.—The infra-red absorption spectra in the interval from 2 to 15 $\mu$ are given for 1-octene, 2-octene, 3-octene, 4-octene, 2-methyl-1-heptene, 6-methyl-1-heptene, and 2 : 2 : 4-trimethyl-1-pentene. General features of these spectra are discussed. J. T.

**1696. Motions of Molecules in Condensed Systems. III. The Infra-Red Spectra for *cyclo*Hexane Solid II, Solid I, Liquid and Vapour in the Range 3 to 15 $\mu$.** G. B. Carpenter and R. S. Halford. *J. Chem. Phys.*, 1947, **15**, 99.—Comparison is made of the infra-red absorption spectra for the same amount of *cyclo*hexane vapour at 20° C, liquid at 10° C, and solid I at 3° C for the interval from 650 to 3300 wave numbers, also when it exists as solid I at − 75° C and solid II at − 110° C for the intervals 700 to 1600 and 2500 to 3300 wave numbers. The four spectra are quite similar and only slightly differ from that of the vapour. The results are in contrast with those reported for benzene and indicate that there is a greater semblance of order in liquid *cyclo*hexane than in liquid benzene. J. T.

**1697. The Mercury Photosensitized Reactions of 1-Butene and 2-Butene.** H. E. Gunning and E. W. R. Steacie. *J. Chem. Phys.*, 1946, **14**, 581.—The products of the reactions of 1-butene with mercury ($^3P_1$) atoms at 30° C are 2-butene and liquid polymer. Other products particularly at low pressures are also formed. In the region of complete quenching the rate of isomerization increases rapidly with pressure while that of polymerization decreases. 2-Butene is less reactive than 1-butene; the product of the reaction being a liquid polymer with smaller amounts of hydrogen and methane. An activated molecule mechanism is suggested to account for the essential aspects of the reaction. J. T.

**1698. The Mercury Photosensitized Reactions of *iso*Butene.** H. E. Gunning and E. W. R. Steacie. *J. Chem. Phys.*, 1946, **14**, 544.—The products of the reaction of *iso*butene with mercury ($^3P_1$) atoms at 30° C are propylene, liquid polymer, and acetylene together with a large number of other products which exist in smaller amounts. In the region of complete quenching the rates of formation of propylene, acetylene, and propane and also the overall rate of consumption of *iso*butene are independent of pressure, and the rate of formation of propylene is double that of acetylene. A mechanism is proposed for the reaction. The average molecular weight of the polymer is suggested to be approximately 240. J. T.

**1699. Solubility of Paraffin-Chain Compounds.** A. Bondi. *J. Phys. and Colloid Chem.*, 1947, **51**, 891.—The data recently published on solubilities of paraffin-chain compounds are subjected to analysis for deviation from Raoult's law and such deviations are expressed as excess free energy of mixing $\Delta F_M$. From plots of $\Delta F_M$ against concentration the relationship between chemical constitution of the solute and its solubility as well as the specific interactions between the solute and the solvent are discussed in detail.

By the application of Guggenheim's solubility theory, the molecule-size differences between solute and solvent in long chain paraffin hydrocarbon in carbon tetrachloride and *cyclo*hexane systems may account for their negative deviation from Raoult's law. The positive deviation from Raoult's law of most paraffin chain compounds in the common solvents can be due to differences in cohesive energy density and to considerable excess entropy of mixing, $\Delta S_M$. Some values of $\Delta S_M$ for systems containing alcohols are estimated and the solubility of fatty acids in water is discussed. J. T.

**1700. Refractive Indices of Soaps and Detergents.** H. B. Klevens. *J. Chem. Phys.*, 1946, **14**, 567.—The variation in the refractive indices with concentration for various soaps may be characterized by an intersection of two linear functions. This intersection is believed to represent the critical micelle concentration above which micelles are formed. The results of experiments on laurylamine hydrochloride and potassium laurate are reported. J. T.

**1701. Effect of Temperature on Mass Spectra of Hydrocarbons.** R. E. Fox and J. A. Hipple. *J. Chem. Phys.*, 1947, **15**, 208.—A description of the ion source for studying the effect of temperature on the mass spectra of hydrocarbons is given. Mixtures of *iso*butane and neon were used and the intensities of various ions in *iso*butane relative to $Ne^{20+}$ were measured at various temperatures. The ion $C_4H_{10}^+$ is about twice as abundant at 70° C as the $C_4H_9^+$ ion becoming equal to it at 180° C and less abundant at higher temperatures. The ratio of these two peaks may be used as a means of measuring the temperature of the source. A similar temperature dependence is detected in the mass 58 peak of *n*-butane. Other hydrocarbons show even greater temperature dependence. J. T.

**1702. Spectrophotometric Studies on Solubilization of Hydrocarbons.** W. Heller and H. B. Klevens. *J. Chem. Phys.*, 1946, **14**, 567.—An emulsion which is strongly light scattering is formed when the limiting concentration of a hydrocarbon, $C_1$, which defines its solubility in a soap is exceeded. $C_1$ is characterized by a minimum in light scattering which is caused by a decrease in size of the molecular aggregates of soap with increasing oil concentrations greater than $C_1$. Solubilization studies on ethylbenzene at 20–25° C have shown that $C_1$ increases with time especially in concentrated solutions and that the number of moles of ethylbenzene dissolved per mole of soap. $R_M$ increases for a given soap concentration with increasing chain length of the molecules. Furthermore, with an increase in the concentration of a given soap, $R_M$ first decreases and after reaching a minimum increases almost linearly without any indication of approaching saturation at a 15% concentration. From the concepts of lamellar micelle-structure and using cross-sectional areas of soap molecules obtained from X-ray measurements one can finally calculate from corrected values of $R_M$, the thickness (spacing) of the individual ethylbenzene layers. J. T.

**1703. Surface Tension in Liquids.** C. Gurney. *Nature*, 1947, **160** (4057), 166.—The tensile stress in the free surface of a liquid is explained in terms of Gibbs' "intrinsic potential " which is a measure of the escaping tendency of molecules. By analogy with a pure solid in equilibrium with its liquid, it is shown that a tension in the plane of the surface must be applied to maintain equilibrium between the molecules in the surface of a liquid and those in the interior. The tension in the surface reduces the intrinsic potential of the surface because of the work done against the tension when a molecule escapes from the surface. Therefore a state of dynamic equilibrium exists, in which molecules entering and leaving the surface do so in numbers which keep the intrinsic potentials of the surface and the bulk liquid equal. H. C. E.

**1704. Ultrasonic Propagation in Liquids. 1. Application of Pulse Technique to Velocity and Absorption Measurements at 15 Megacycles.** J. R. Pellam and J. K. Galt. *J. Chem. Phys.*, 1946, **14**, 608.—Description of an apparatus is given which generates pulses of 1 microsecond duration at 15 mc/sec and picks up the resultant echo from a plane reflector. Measurements of sound velocity and absorption are reported for a number of homologous series of organic liquids, including some alkyl halides, benzene, and paraffins. J. T.

## Analysis and Testing.

**1705. Copper-Strip Corrosion Tests.** J. A. Bolt. *Oil Gas J.*, 9.8.47, **46** (14), 99.—Brief details are given of the Philadelphia and three A.S.T.M. copper strip test methods, and their import and the causes of corrosion are discussed. Tests on various refinery products show that copper strip corrosion manifests itself in a series of distinctive colours. A summary is given of the work so far carried out to develop corrosion standards, and a tentative set of copper standards is given in a table showing corrosion numbers (1–12) and descriptive terms for them. Further work to be undertaken to establish permanent standards, in which the colour of the strip is also a function of the corrosive sulphur present in the sample, is outlined. The requirements in materials, *e.g.*, a corrosive sulphur compound and a non-corrosive diluent suitable for making the standard strips, are discussed. Elemental sulphur or a brand product such as sulphurized pentane (Ortholeum 202 made by Du Pont de Nemours and Co.), appear promising for the purpose. For the non-corrosive diluent; pure *n*-heptene and cetane seem suitable. The preparation and preservation of the copper strip standards are discussed. W. H. C.

**1706. Engine Testing of Fuels and Lubricants. 4. Lubricants—General Observations (Part 1).** P. H. Moore. *Petroleum*, June 1947, **10**, 129.—A detailed discussion on the selection of test engines to evaluate lubricant quality is given. There are two methods of obtaining a suitable power unit. Either a commercial unit can be modified to obtain the necessary control of operating conditions, or a special engine can be built. Of the points discussed regarding test-engine requirements, that of ensuring accurate methods of governing the engine temperature is stressed. Details as to how this can be accomplished are given.

A table showing the uses claimed for five of the most popular special test engines used in the United States is given. The engines are (1) Caterpillar (single-cyl, 4-stroke, diesel); (2) Caterpillar (4-cyl, 4-stroke, diesel); (3) Chevrolet (6-cyl, 4-stroke, petrol); (4) General Motors, Series 71 (2-stroke, 3- or 4-cyl, diesel); and (5) Lauson (single-cyl, 4-stroke, petrol).

The main features of the Lauson engine are given and also its performance curves. It does not replace the more elaborate tests on Caterpillar or Chevrolet engines, but is used as a rough screen for oils to be further tested. F. W. H. M.

**1707. Infra-Red Absorption Analysis of Gases and Vapours (3). 3. Commercial Instruments.** R. Quarendon. *Petroleum*, May 1947, **10**, 106.—In this third article dual-path analysers are discussed and commercial instruments described.

Dual-path analysers have in recent years been used as a means of overcoming obstacles caused by changes in the intensity of the energy emitted by the source, such as arise from fluctuations in its temperature, variations with wavelength of the radiation, and background absorption due to carbon dioxide and moisture in any air lying in the path of the radiation. The use of balanced systems of this type has also fostered the development of automatic instruments which give a direct recording of the transmission ratio. Means of balancing and the advantages of automatic recording are discussed and optical diagrams are given.

The Beckman I.R.2. spectrophotometer is a rock-salt prism instrument modelled on the well-known Beckman U.V. quartz spectrophotometer. An ingenious device is employed for obtaining adequate sensitivity in the measurement of the bolometer output. The energy from the infra-red source is caused to appear in the form of an alternating current which can be separated from general background " noise." This is done by interrupting the radiation from the Nernst glower ten times a second by a rotating chopper. The resulting pulsating bolometer output is amplified by an electronic circuit tuned to this frequency and is fed to a potentiometer arranged to indicate or record, at the selected wavelengths, the percentage transmissions or optical densities. Mention is also made of the recent Beckman Mark III instrument.

The Perkin–Elmer infra-red spectrophotometer differs from the Beckman chiefly in the use of the more conventional vacuum thermocouple-galvanometer system for energy measurement. The Perkin–Elmer Corpn Model 12A-B combines an electronic amplifier and recorder with the model 12A spectrometer—to form a very convenient recording desk unit. An optical diagram of the 12A analyser is given.

A British model constructed on more or less conventional lines is briefly described.

An advanced instrument designed in the Oppau laboratories of I.G. Farben during 1938–39 uses the dual-path approach in conjunction with a bolometer as energy detector, and gives a direct record of percentage absorption against wavelength. A noteworthy feature is the production of a linear wavelength scale on the recorder chart. This is done by automatically increasing the inlet slit width with increasing wavelength to offset the decrease in intensity of the infra-red beam. F. W. H. M.

## Gas.

**1708. Propane. (Refiner's Notebook No. 157.)** W. L. Nelson. *Oil Gas J.*, 16.8.47, **46** (15), 113.—Tables are given showing : (*a*) the properties of pure propane ; (*b*) the vapour pressure, latent heat, at − 70° F to + 120° F ; density and heat content of liquid and vapour for the same range of temperatures ; (*c*) specifications of propane, research, technical, and pure grades. Notes are given on filling propane cylinders : (1) if cylinder is dry ; (2) if cylinder contains liquid (particularly heavy oil).

W. H. C.

## Lubricants.

**1709. Steam Turbine Lubrication Problems and Their Solutions. 4. Primary Rusting.** A. Wolf. *Petroleum*, June 1947, **10**, 134.—Since one of the major causes of turbine oil deterioration in service is direct contact of the oil with the ferrous surfaces of the lubrication system and the rusting of these surfaces, it would appear desirable to protect them with a coating of enamel or paint.

Ordinary oil paints and oil-gum enamels being oil-soluble, not only does this nullify the purpose for which they were to be used, but the turbine oil is rendered emulsifiable and very prone to oxidation. Linseed and other drying-oil paints should never be used as they show minimum oil and alkali resistance and the organometallic " driers " present are powerful oxidation catalysts.

Paints with synthetic resin bases may be oil-proof under turbine lubrication conditions, but particularly severe tests should be given to coating compositions before acceptance for turbine systems. The possible presence of alkalis or other water-softening materials in boiler water carry-over should not be overlooked.

It is considered that, if the initial charge of oil in a brand-new turbine is properly inhibited against rusting and corrosion, no painting of the oil reservoir or other parts of the lubrication system is necessary.

Sluggish operation and sticking of the governor gear is the most common manifestation of the occurrence of obstructive solid deposits in a lubrication system. These deposits may result from rusting or deterioration of the oil.

If the oil is centrifugally purified, rapid accumulation of ferruginous solids in the centrifuge bowl gives warning of impending trouble. This will particularly be the case if the oil is suffering rapid oxidation catalysed by rust. If asphaltic and resinous oxidation products of the oil accompany the ferruginous deposits it is too late to do anything but change the oil and clean out the lubrication system.

This should be anticipated by chemical examination of oil from the system at, say, monthly intervals. In turbines where previous charges of the same type of oil have given trouble more frequent samples, at least for acidity tests, should be taken. The rate of increase of acidity should then give ample warning of oil deterioration and the necessary steps can then be taken to avoid subsequent interference with the proper operation of the turbine.

The rate of acidity increase is valueless, however, for indicating whether rusting is occurring in a brand-new turbine filled with new oil. In this case rusting due to moisture alone may occur and would bear no relation to the condition of the oil, whereas in turbines which are not new the rusting is primarily due to the formation of certain acids in the oil. In this connexion, the newer and more highly refined the oil, the less protection it offers ferrous surfaces to attack by moisture while partially oxidized oils generally offer this protection.

Solvent-refined turbine oils possess many advantages over the older conventionally refined turbine oils, but until the discovery of efficient corrosion inhibitors, their use led to rusting troubles in new turbines. This is attributed to the removal by refining of natural polar constituents which would otherwise enable the oil to inhibit rust formation.

The employment of used oxidized turbine oil as a rust preventer in new turbine oils is discussed and deprecated.

The addition to highly refined oils of substances of the high molecular weight fatty acid type—*e.g.*, stearic acid, will prevent fresh water primary rusting both in the laboratory test (A.S.T.M. D.665–44(T)) and in new turbines.

More recent effective inhibitors comprise synthetic organic compounds containing an " active " phosphorus atom, derivatives of certain dicarboxylic aliphatic organic acids, etc. While these corrosion inhibitors are efficient for their purpose, they are not generally good anti-oxidants under service conditions. This may lead to rusting due to oil deterioration after comparatively short running time. Conversely, oxidation inhibitors, in general, will not serve as corrosion inhibitors.

This makes it necessary to inhibit best grades of turbine oil against both oxidation and corrosion so that they can be used in both new turbines and those already in use.

Sufficient polar bodies may be formed by mild oxidation, after a turbine has been running for a few weeks, as to render a corrosion inhibitor unnecessary. If a potent oxidation inhibitor is used, however, the delay in forming polar bodies may render the oil insufficiently capable of preventing primary rusting.

A potent rust inhibitor is especially valuable in cases where sea-water is used for cooling in marine turbines.

It is stated that when once polar bodies have formed a protective coating on the ferrous surfaces no further primary rusting will occur even with a change of oil containing no corrosion inhibitor.

Research in the U.S.A. has shown that in order to function as a rust preventer an organic acid must be not only polar and oil soluble but also insoluble in water. The lower organic acids strongly promote rusting, are water soluble and appreciably volatile at temperatures prevailing in turbine oil reservoirs and other parts of the lubrication system. F. W. H. M.

**1710. Viscosity as a Technical Characteristic of Lubricating Oils.** E. G. Semenido. *Petroleum*, May 1947, **10**, 110. (Translated and edited from the Symposium on The Viscosity of Liquids and Colloidal Solutions, Academy of the Sciences, U.S.S.R., 1944, **2**, 217–221.)—See Abstract No. 1255 (1945). F. W. H. M.

## Engines and Automotive Equipment.

**1711. British Power Units.** Anon. *Flight*, 4.9.47, **52**, 250.—Up to date tabulated information of current aircraft gas turbines and piston engines is given. Mention is also made of several new gas turbines, and one or two piston engines for which full details will become available later. I. G. B.

**1712. British Power Units.** Anon. *Flight*, 11.9.47, **52**, 267.—Additional information and illustrations of British engines is given to supplement the data tables already published in the issue of 11.9.47. I. G. B.

**1713. Naiad Announced.** Anon. *Flight*, 4.9.47, **52**, 254.—This is the first announcement of the Napier Company's entry into the gas turbine field.

This is a 1590 E.B.H.P. airscrew unit, comprising an axial flow compressor, five straight-through parallel-sided combustion chambers and two-stage turbine.

| | |
|---|---|
| Maximum diameter | 28 in |
| Length | 8 ft 6 in |
| Weight | 1095 lb |
| Sea level or static conditions | 18,250 r.p.m. 241 net jet thrust |
| Consumption | 128·8 G.P.H. |

I. G. B.

**1714. 4800 B.H.P. G.E.C. Gas Turbine.** Anon. *Motor Ship*, Sept. 1947, **28** (332), 221.—This prototype gas turbine is being built for industrial purposes coupled to a generator, but also suitable for gas-turbo electric propulsion. Turbine entry temperature is 1400° F and efficiency referred to turbine shaft output is about 17%, based on the lower heating value of Bunker " C " fuel oil. The fuel nozzles are of the air atomizing type. I. G. B.

**1715. Survey of the Calculated Efficiencies of Jet Power Plants.** J. H. Keenan and J. Kaye. *J. Aero. Sci.*, 1947, **14**, 437.—The elements of the plant are divided into propeller, diffuser, compressor, combustor, turbine, propulsive nozzle, and reciprocating engine. The major variables are pressure ratio, speed, and maximum temperature and diffuser efficiency. An attempt is made to compare the efficiencies of moving power plants with stationary ones so as to give the whole subject a degree of coherence. I. G. B.

**1716. Aircraft Rocket Motors.** A. D. Baxter. *Airc. Engng*, Aug. 1947, **19** (222), 249.—Rocket motors are distinguished by the oxygen bearing fluids they use : (*a*) Liquid oxygen ; (*b*) Nitric acid ; (*c*) Hydrogen peroxide.

General theoretical requirements are tabulated and there follows a discussion of fuels (hydrogen peroxide, hydrocarbon) and rocket motors (glide bomb, assisted take-off, aircraft main motor, main regulating valve, turbine speed control valves, turbo pump assembly, combustion chamber). I. G. B.

**1717. Photography in Engine Research.** H. G. Goulding. *Airc. Prod.*, Sept. 1947, **9** (107), 338.—In the concluding instalment the author reviews stroboscopic and photo-elastic practice and goes on to describe applications of cine photography at normal and high speeds. I .G. B.

**1718. First Year's Performance of the " Auricula ".** Anon. *Motor Ship*, Sept. 1947, **28** (332), 230.—Operating conditions are described in this trial substitution of good grade boiler oil for diesel oil in the 4000 i.h.p. supercharged Hawthorn-Werkspoor engine.

With the exception of one cleaned piston, the remainder of the parts were precisely as removed from the engine and the condition of the various valves was little different from that which might be expected in machinery running on a far better class fuel.

Details are given of the constituents extracted by the centrifuging process.

I. G. B.

## MISCELLANEOUS.

**1719. Competitive Fuel Prices.** A. J. McIntosh. *Min. & Metall.*, 1947, **28**, 447–450.—Since 1940 the retail price of oil fuels has increased less than that of anthracite, resulting in space heating by oil becoming cheaper. Tables are given showing the relative heating efficiencies for oil, gas, and coal, together with the B.Th.U. content of these fuels. Distinction is made between various types of coal and oil and between automatic and hand control for the firing of the former. Bituminous coal, where used, is still cheaper than oil and the latter has no advantage over natural gas, the supply of which is, however, often inadequate. Oil shows a definite advantage when compared to anthracite and future price trends indicate that this may be accentuated. V. B.

# BOOKS RECEIVED.

**British Chemical Plant.** British Chemical Plant Manufacturers Association. London : B.C.P.M.A., 1947. Pp. 212.

This first post-war edition of *British Chemical Plant* is a valuable guide to British manufacturers of chemical plant, the term " chemical plant " being defined as " all plant, equipment, and accessories utilized in these processing industries where materials undergo a change of state or composition." Examples of such processes included in the book are those for the production of coal derivatives, coal-tar products, aromatic hydrocarbons and dyestuffs ; petroleum and other products of mineral oil origin, including chemicals, synthetic rubber, synthetic and substitute fuels and derivatives.

In this book the ninety-five member firms of the B.C.P.M.A. illustrate and describe some of their products, and thirty-eight pages are devoted to a useful classified index of the products and services available from members of the Association. The work should prove of great value to buyers in the field of chemical plant.

**The Petroleum Industry.** Josephine Perry. New York : Longmans, Green and Co., Inc., 1946. Pp. 128. $2.

The foreword states that this book " deals briefly with a few of its [the petroleum industry] chief phases, chosen to give to the boys and girls of America a true picture of the magnitude and importance of an industry which so vitally influences the everyday life of the people."

**Vapour Adsorption.** Edward Ledoux. Brooklyn, N.Y. : Chemical Publishing Co., Inc., 1945. Pp. 360 + xvi. $8.50.

A compilation of the theories of numerous investigators and writers on absorption, followed by sections on the essentials of vapour and heat transfer, dynamic absorption, and industrial applications.

**Practical Accounting for Oil Producers.** Robert M. Pitcher. Tulsa, Oklahoma : Mid-West Printing Co., 1947. Pp. 645 + ix.

This revised edition incorporates changes in accounting procedure made necessary by regulations of the U.S. revenue authorities. Numerous problems peculiar to oil production accounting are presented, with solutions, and material for a complete set of accounts is given.

**Those Who Know You Well Think Well of You.** New York : American Petroleum Institute, 1946.

In 1946 the Opinion Research Corporation carried out, on behalf of the A.P.I., a nation-wide survey of attitudes towards the petroleum industry. In Part I the significant facts revealed by the survey are summarized, in Part II the highlights are cross-analysed to give a fairly complete picture, and in Part III complete tables of replies to all questions are given.

**Oil Across the World.** Charles Morrow Wilson. New York : Longmans, Green and Co., Inc., 1946. Pp. 318 + ix. $3.50.

The evolution of the pipeline is traced from its infancy, with particular reference to the petroleum industry and its growth. Finally, William G. Heltzel contributes a " Pipeline Manual " and there is a useful bibliography of thirty entries.

**Early Geophysical Papers of the Society of Exploration Geophysicists.** L. L. Nettleton (Editor). Tulsa, Oklahoma : Society of Exploration Geophysicists, 1947. Pp. 844 + iv. $6.

The Society of Exploration Geophysicists was organized early in 1930, but its journal *Geophysics*, did not make its first appearance until January 1936. In the intervening period many geophysical papers were presented at meetings and published in various journals or in mimeographed form.

Many of these earlier scattered papers are not now available to the greatly increased numbers interested in the subject. Consequently the Society authorized their reproduction in the present single volume.

## Technical Missions to Germany and Japan.

Further official reports have been received as follows :

### F.I.A.T. REPORTS.

757. Production of Potassium Permanganate and Manganese Chloride. Pp. 19.
948. Report Index on German Aeronautical Research Documents. Pp. 104.
967. Polymerization of Acetylene to *cyclo*Octatetraene. Pp. 124.
968. Alcohols by Hydration of Olefines. Pp. 33.
1012. Screening Device for Slurries of Organic Chemicals. Pp. 4.
1073. Manufacture of Acetoacetic Acid Ethyl Ester at I.G. Farbenind. A.G., Hoechst am Main. Pp. 8.
1081. Manufacture of Diethylamine from Acetaldehyde. Pp. 14.
1095. Vapour-liquid Equilibria of Binary Hydrocarbon Mixtures. Pp. 23.

### B.I.O.S. REPORTS.

1122. Avoidance of Toxic Hazards in Some German Chemical Factories. Pp. 68
1146. I.G. Farbenindustrie. The Separation of *ortho*-, *meta*-, and *para*-Xylenes and the Manufacture of the Derived Nitroxylenes and Xylidines. Pp. 64.
1154. Some Miscellaneous Organic Intermediates and Products: Manufacture (mainly) by I.G. Farbenindustrie. Pp. 47.
1210. Chemisch-Physikalische Versuchs, Anstalt der Marine, Kiel. Fuels, Lubricants, and Organization. Pp. 31.
1321. Control Instruments in the German Chemical Industry. Pp. 82.
1434. Bituminous Building Materials with particular reference to the "Kerasolith" Process for Chemical Tanking and Flooring. Pp. 37.
1487. Chemical Laboratory Instrumentation in Germany. Pp. 107.
1501. Aspects of Industrial Medicine and Hygiene in German Chemical Factories. Pp. 81.
1532. Fan Engineering in Germany. Pp. 17.

### B.I.O.S./J.A.P./P.R. REPORTS.

821. Japanese Fuels and Lubricants, Research on Diesel and Boiler Fuel at the First Naval Fuel Depot, Ojuna. Pp. 114.
829. Japanese Fuels and Lubricants, Miscellaneous Oil Technology and Refining Installations. Pp. 86.

### C.I.O.S. REPORTS.

xxxii–109. Interrogation of Dr. Haus Friedrich Gold. Pp. 25.

# APPLICATIONS FOR MEMBERSHIP OR TRANSFER.

NOVEMBER, 1947.

The following have applied for admission or transfer to the Institute. In accordance with the By-laws, the proposals will not be considered until the lapse of at least one month after the publication of this *Journal*, during which time any Fellow, Member, or Associate Member may communicate by letter to the Secretary, for the confidential information of the Council, any particulars he may possess respecting the qualifications or suitability of the candidate.

The object of this information is to assist the Council in grading the candidate according to the class of membership.

The names of candidates' proposers and seconders are given in parenthesis.

*Applications for Membership.*

BLIGHT, Norman Bernard, Assistant Engineer, Atlantic Refining Co. of Africa.

COWLES, Melbourne Thomas, Representative, Standard Vacuum-Oil Company, London. (*H. B. Borwick ; S. J. M. Auld*).

CREAL, Norman Reginald, Acting Assistant Foreman, Agwi Petroleum Corpn. Ltd. (*F. Mayo ; K. Parsonage*).

DASHWOOD, John Horace Cassels, Army Officer on Petroleum Engineering Course at National Oil Refineries Ltd. (*T. M. Simmons ; R. B. Southall*).

EVANS, William Edward, Cost Accountant, National Oil Refineries Ltd. (*R. B. Southall ; E. S. Squire*).

FRANCIS, Edward Arthur Lionel, Army Officer on Petroleum Engineering Course at National Oil Refineries Ltd. (*T. M. Simmons ; R. B. Southall*).

GODFREE, Reginald Bruce, Research Group Leader, Esso Development Co. Ltd. (*C. S. Windebank ; E. B. Evans*).

HALL, Anthony Offley, Army Officer on Petroleum Engineering Course at National Oil Refineries Ltd. (*T. M. Simmons ; R. B. Southall*).

JONES, John William Thomas, Chemist, National Oil Refineries Ltd. (*R. B. Southall ; E. S. Squire*).

JONES, Leighton Warmington, Student, Walthamstow Technical College. (*D. Glynn Jones*).

JONES, Vincent Cadarn Reece, Laboratory Shift Supervisor, Agwi Petroleum Corpn. (*F. Mayo ; K. Parsonage*).

LENNIE, Douglas Walker, Engineer, English Drilling Equipment Co. Ltd. (*W. E. V. Abraham ; F. Walmsley*).

RECINE, Arnaldo Giovanni, Chief Executive of Lubrication School, Italy. (*G.W. D'Arcy-Evans ; G. H. Harries*).

REID, Graeme, Army Officer on Petroleum Engineering Course at National Oil Refineries Ltd. (*T. M. Simmons ; R. B. Southall*).

SHATWELL, Victor Leslie, Chief Chemist, Chiswick Products Ltd. (*W. J. Wilson ; S. T. Minchin*).

SMITH, John Charles, Demonstrator and Lecturer, Oxford University. (*F. Morton ; A. E. Dunstan*).

TANNER, Elsie May, Research Chemist, Trinidad Leaseholds Ltd. (*T. K. Hanson ; R. Sefton*).

TAYLOR, John Harold, Works Chemist, Snowdon, Sons & Co. Ltd. (*J. E. James ; E. R. Redgrove*).

THOMAS, David John, Trainee Process Foreman, Agwi Petroleum Corpn. Ltd. (*F. Mayo ; K. Parsonage*).

Wildig, Colin Arthur, Technical Representative, Matthew Wells & Co. Ltd. (*V. H. Stott; M. Mason*).

Williamson, Gordon McPherson, Chemist, Anglo-Iranian Oil Co. Ltd. (*D. A. Howes; F. Gill*).

Zwicky, Max, Chief Mechanical Engineer, Sulzer Brothers Ltd., Switzerland. (*P. Draper; C. W. G. Martin*).

*Transfer.*

Evans, Frederick Neville Stuart, District Manager, Petroleum Board. (*T. K. Hanson; R. Sefton*). (*Associate Member to Member*).

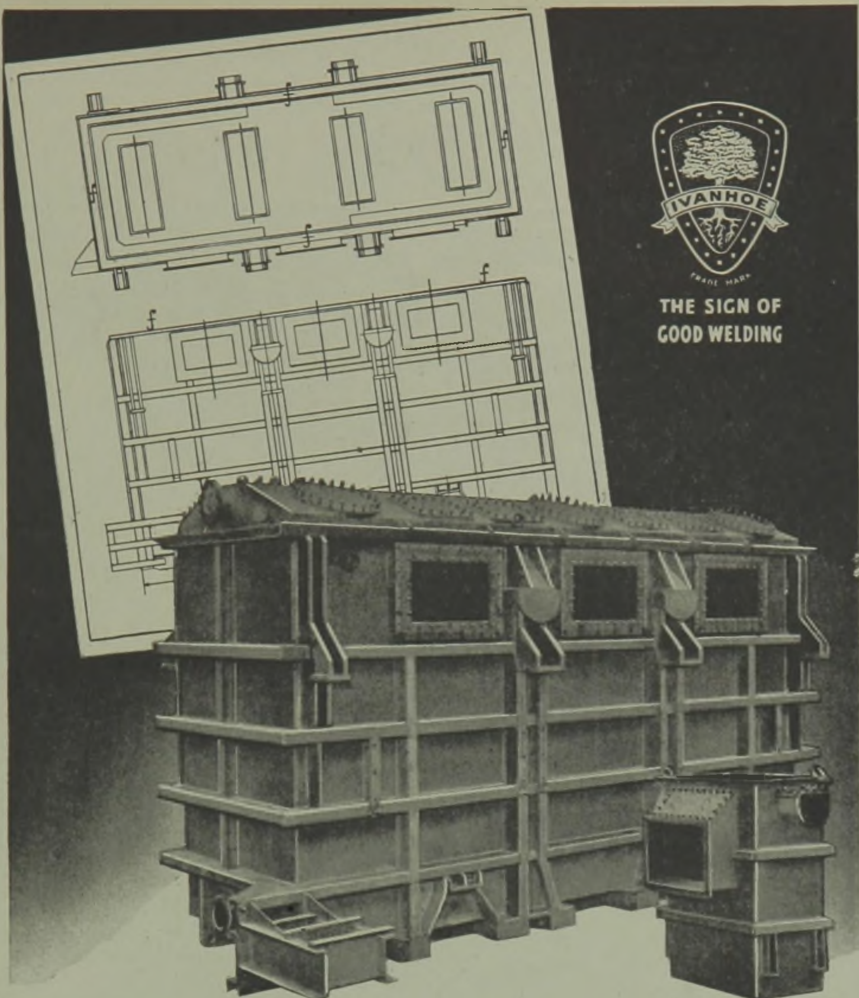
Goodfellow, Alfred John, Analytical Chemist, Carless, Capel & Leonard Ltd. (*R. I. Lewis; E. Thornton*). (*Student Member to Member*).

Wilson, Alfred John, Petroleum Technician, Cities Service Oil Company. (*W. Kay; H. Baker*). (*Associate Member to Fellow*).

## ELECTION TO COUNCIL.

The attention of members of the Institute is directed to the following extracts from the By-Laws governing election to the Council of the Institute:—

> 72. Each and every Corporate Member may nominate in writing a Corporate Member for election as a Member of Council. . . . A nomination to be valid must be signed by at least six other Corporate Members and must be received by the Secretary not later than the thirty-first day of December in any year. No member may sign more than one such Nomination Paper at any one election. . . .

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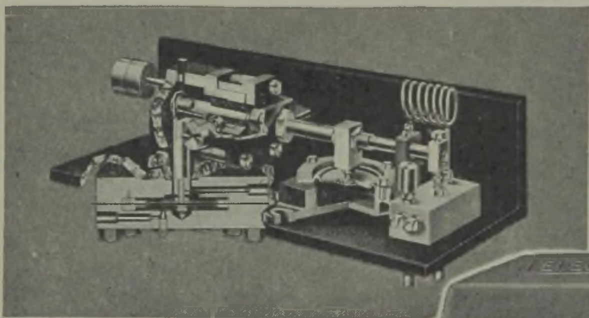

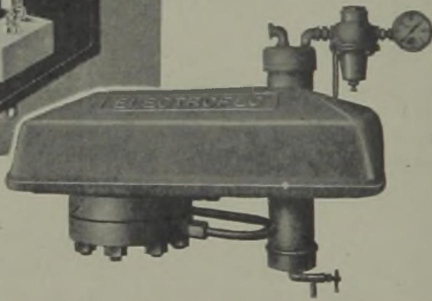


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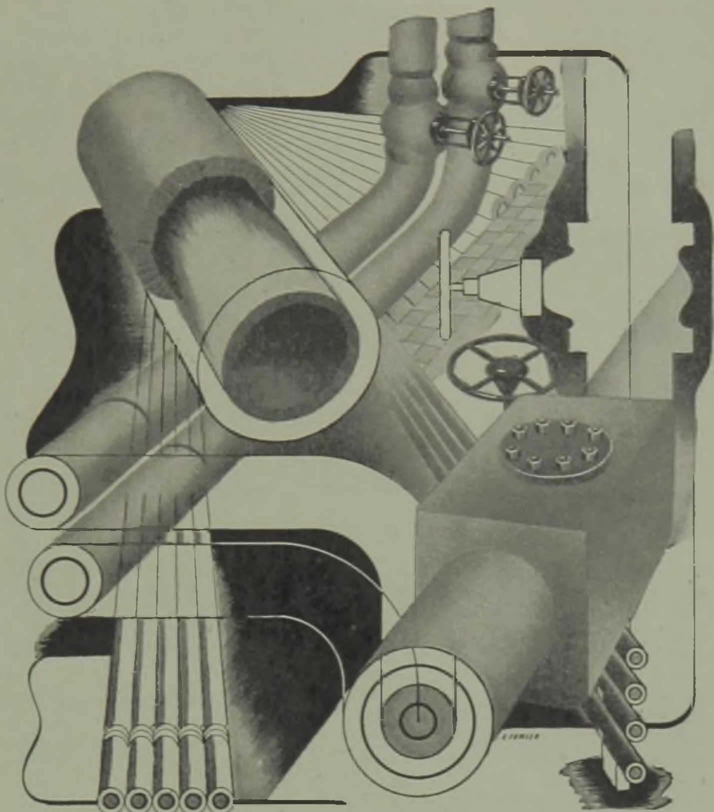

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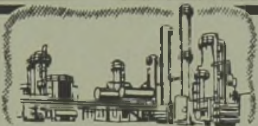



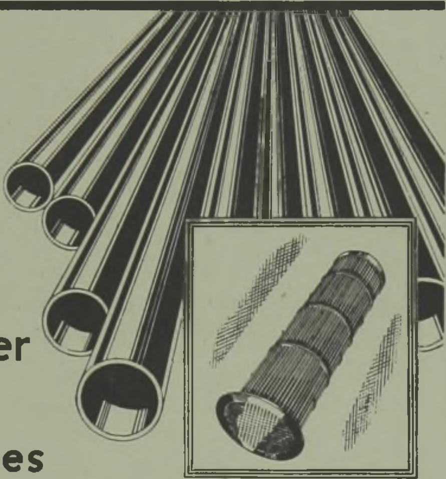

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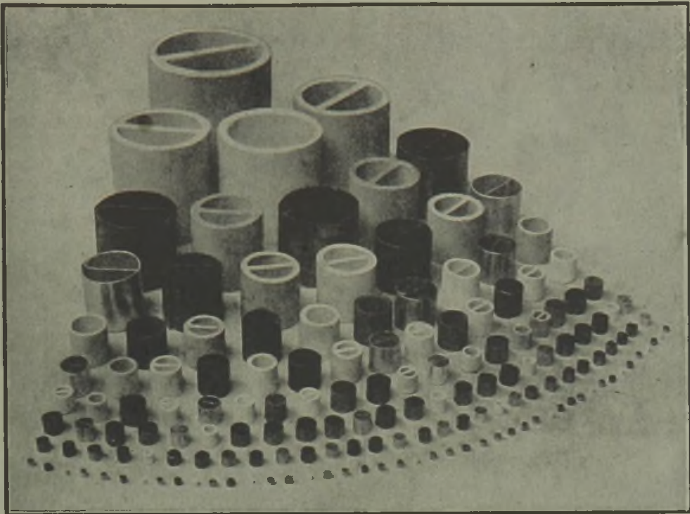

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