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CHARLES BOHDANOWICZ

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OIL FIELDS OF POLAND, GEOLOGICAL AND STATISTICAL SUMMARY[1]

CHARLES BOHDANOWICZ[2]
Warsaw, Poland

ABSTRACT

The present article is a tabulated summary of the geological and statistical features of Poland's oil fields as of April, 1933, and may be regarded as a continuation of an article by the same author, published in the *Bulletin of The American Association of Petroleum Geologists*, November, 1932.

INTRODUCTION

The oil and gas fields in the Carpathians of South Poland lie in an area where two provinces are recognized: (1) the sub-Carpathian province embracing the gentle mountainous area in front of the orographically exposed Carpathian ridge, and (2) the Carpathian province. The first province—from the point of view of geological structure—represents areas constituting a tectonic unit of the first order or a part of the foreland depression in front of the margin of the Carpathian folding, whereas the second province comprises an entire complex of geologic units of diversified structure.

In the sub-Carpathian province prevail only Miocene formations, under which are concealed the primordial folds of the Carpathians composed of Oligocene. Until now only gas fields have been discovered in this area (Daszawa, Kalusz), covering in Daszawa an area of several thousand hectares.[3] Test drilling, having for its object the investigation of the lower sequence of the Miocene (the upper series of which contains the gas horizons), has been commenced by the Pionier Company. The first test well was located near Rachin, southeast of the Daszawa gas fields, after this part of the sub-Carpathian depression had been investigated by the seismic and magnetic methods. On the basis of geological considerations, this part of the sub-

[1] Manuscript received, May 4, 1933. Supplement to "Geology and Mining of Petroleum in Poland," by same author, published in the *Bulletin*, Vol. 16, No. 11 (November, 1932), pp. 1061–91.

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[3] One hectare equals 2.471 acres.

Carpathian province, which comprises an area between the meridian of Boryslaw and Kosow, that is, an area of not less than 5,000 square kilometers (500,000 hectares, or 1,235,500 acres) represents the greatest possibilities as regards prospecting work, and may be accepted as possible oil land.

The Carpathian province consists of 3 zones of a different structure: the Marginal zone along the sub-Carpathian depression, the Median zone or a distinctly marked longitudinal depression lying between the slightly more elevated Marginal zone on the northeast and a likewise elevated zone on the southwest, or Magura zone, which passes into the Czechoslovakian territory.

SUMMARY

The area of the Marginal zone (Fig. 1) in its more precise limits, between the slice of Skole and the edge of the sub-Carpathian depression, occupies approximately 240,000 hectares: the producing, proved (not all of economic value), and probable lands within this area comprise approximately 3,430 hectares, or 1.5 per cent of the total area.

The area of the Median and Magura zones, within very broad limits, occupies about 1,454,400 hectares, of which from the town of Nowy Sącz on the northwest to Zabie on the southeast, near the Bukowina frontier, there is approximately 0.6 per cent of the total area. Of the tremendous area of the Carpathian petroliferous province, 97.8 per cent has not been tested at all commercially. A large part of this area, composed of complexes of slices (*skiby*) or of deeply folded formations of secondary longitudinal depressions of synclinal structure, or of folds of the diapiric type, is not promising for oil prospecting. However, within the area of the Median zone and on the northern portions of the Magura zone, there may be areas suitable for test drilling with the object of discovering new oil horizons (Cretaceous) deeper than the horizons already proved. Producing and proved lands do not exceed 3,000 hectares, and are therefore considerably less than Tolwinski's calculations.[4] The area of producing oil fields of the Carpathian province amounts to 7,300 hectares. The difference between our calculation of the producing and proved lands (3,000 hectares) and the foregoing figure covering producing land (7,300), is 4,300 hectares, representing approximately the area of semi-proved land. It is estimated that 97.8 per cent of the area of the Carpathian province should be classified as commercially unproved

[4] *Statistique du Pétrol en Pologne* (1932).

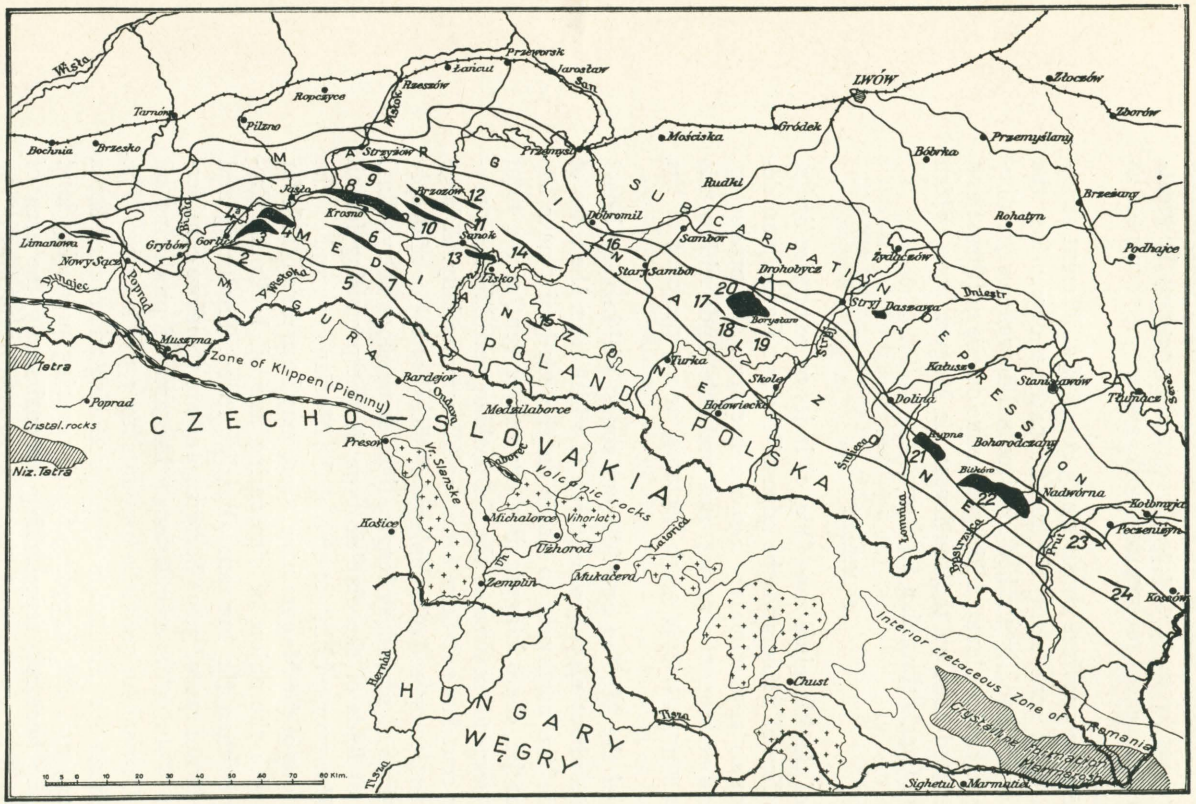

FIG. 1.—Oil fields of Polish Carpathian Mountains. *1.* Klęczany. *2.* Ropa-Szymbark-Siary-Męcina-Ropica. *3.* Dominikowice-Kobylanka-Libusza-Kryg. *4.* Harklowa-Wójtowa. *4a.* Biecz-Załawie-(Korczyna). *5.* Ropianka-Smereczna-Wilsznia-Komornik (Czechoslovakia). *6.* Bóbrka-Wietrzno-Równe-Rogi. *7.* Rudawka Rymanowska-Tokarnia-Wola Sękowa. *8.* Sądkowa-Białkówka-Brzezówka-Męcinka-Jaszczew (gas fields) and Potok-Toroszówka-Krosno-Krościenko-Trześniów (oil fields). *9.* Węglówka. *10.* Zmiennica-Turzepole-Strachocina. *11.* Starawieś-Brzozów-Humniska-Grabownica. *12.* Izdebki-Witryłów. *13.* Zagórz and vicinity. *14.* Stańkowa-Paszowa-Ropienka-Wańkowa-Leszczowate. *15.* Rajskie-Polana and vicinity. *16.* Starzawa-Stara Sól-Strzelbice. *17.* Opaka. *18.* Schodnica. *19.* Pereprostyna-Urycz. *20.* Borysław-Tustanowice-Mrażnica. *21.* Rypne-Duba-Perehińsko. *22.* Majdan-Rosulna-Bitków-Pasieczna. *23.* Słoboda Rungurska. *24.* Kosmacz.

Map shows three tectonic zones, each overthrust northeast toward sub-Carpathian depression (foreland): (1) Magura (not oil-bearing excepting in tectonic inliers), (2) Median (oil in Cretaceous-Oligocene), (3) Marginal (oil in Cretaceous-Oligocene). In sub-Carpathian depression gas is produced from Miocene. East-west length of area mapped, approximately 236 miles.

land; part of these lands may represent possible oil lands, but it is impossible to express this in figures.

In order to make a correct appraisal of these lands, it should be taken into consideration that the production of 1 hectare of the 2,516 hectares of the producing area is estimated since the beginning of the industry at 1,200 cars[5] (total volume of oil produced hitherto in Poland, 3,069,758 cars). Tolwinski estimates that the oil fields of Poland are not exhausted, and that with an improved method of exploitation they may yield a maximum of 100 tank cars per hectare. In view of the foregoing, from 7,300 hectares of producing and proved land, he could expect about 7,300×100 cars, or 730,000 cars. According to our calculations the reserves on producing and proved lands do not exceed 500,000 cars. It should, however, be kept in mind that 75 per cent of the entire production in the Carpathians was obtained in the Boryslaw-Tustanowice-Mraznica fields, having an area of 1,140 hectares, or only about 45 per cent of the total area of the producing oil fields; therefore, this possible reserve could be lifted only during a very long period of time. If the average decline in production of 7 per cent for the past 5 years is taken as a basis for estimating the entire reserve to be lifted, this reserve would be exhausted within 17 or 18 years.

The geological surveys in the Carpathians have progressed already to such an extent since 1924 that it may be asserted that in the unproved area mentioned (97.8 per cent of the Carpathians) there are only local forms of structure suitable for prospecting oil horizons of minor industrial importance. Several wells drilled recently by the Pionier Company and other firms on such favorable structure gave negative results.

In order to appraise the possible oil reserves in the Carpathians, therefore, 97.8 per cent of the area should be entirely eliminated.

[5] One tank car of oil equals 10 metric tons, or approximately 74 barrels.

OIL FIELDS OF POLAND (GEOLOGICAL AND STATISTICAL SUMMARY)

JASLO DISTRICT—MAGURA ZONE[1]

Oil Fields[1]	*Columnar Section and Oil Horizons*			*Structure*	*Area (Hectares)* 1. *Producing* 2. *Proved* 3. *Probable*
	Oligocene	*Eocene*	*Cretaceous*		
	Magura Sandstones	*Red and green shales with sandstones*	*Ropianka beds and black shales, biluminous*		
1. Klęczany and vicinity			Sandstones in Ropianka beds	One complex of series supposed to be overthrust on facies of Median zone, confirmed near north margin of Magura zone, near Kryg, Harklowa, Pagorzyna. Oil fields are on marginal parts of Magura unit. Lower Cretaceous series not sufficiently explored	1. 30 2. — 3. 120 Oil trend 12 km. long
1a. Posadowa and vicinity			Same		1. 5 2. — 3. 160 Oil trend 16 km. long
2. Szymbark, Siary, Sękowa, Męcina Wielka, Ropica Ruska			Same		1. 30 2. — 3. 4,000 Many groups
5. Ropianka			Same		1. 10 2. 20 3. 300

[1] Location of geologic or tectonic zones, and oil and gas fields, shown by corresponding number on Figure 1.

Depths of Wells (Meters)	*Number Producing Wells, Jan. 1, 33*	*Number New Drilling Wells, 1932*	*Initial Production (Kilograms)*	*Early Prod., Cars, 1932*	*Number Wildcat Wells, 1932*	*Crude Oil*		*Remarks* *Yield Cumulative, Dec. 31, '32* *Reserves Estimated, Cars*
						Density	*Quality*	
200	1	—	—	2	—	a. 0.870 b. 0.780	Lubricating and vaseline Gasoline, 22% Some paraffine Gasoline, 43%	Yield? Reserves?
450–551	2	—	—	2	—		Paraffine Gasoline, 22%	Yield? Reserves?
150–435	48	5	1,000–2,500	180		a. 0.822 0.828 b. 0.850 0.857	Paraffine Gasoline, 30% Lubricating Gasoline, 30%	a. Szymbark b. Męcina Wielka, Sękowa, Ropica Ruska. Yield? Reserves, 3,000
300–569	12			30		a. 0.720 b. 0.850	Non-paraffine Gasoline, 32%	Yield, 1,800 Reserves, 4,000 (?)

JASLO DISTRICT—

Oil Fields	Columnar Section and Oil Horizons: Oligocene — Krosno beds and menilite slates	Eocene — Red and green shales with sandstones (Cieszkowice)	Cretaceous — Black shales with sandstones	Structure: Folds on parts of greatest culmination in middle of great inter-Carpathian depression, but local structure in each field	Area (Hectares) 1. Producing 2. Proved 3. Probable
3. Dominikowice, Kobylanka, Libusza, Lipinki, Kryg	I horizon in Krosno beds	Ciężkowice sandstones II–III. Porosity, 23–24%. Thickness of sandstones, 5–18 meters	IV horizon sandstones in black shales	One large fold in front of marginal part of Magura zone	1. 150 2. 50 3. 300
4a. Harklowa b. Pagorzyna c. Biecz	a. Krosno beds	Ciężkowice sandstones I–II. Thickness of sandstone series 15–19 m. with few oil sands, 2–3 meters		At Hraklowa and Pagorzyna below Eocene cover overthrust from south. Biecz, diapiric fold inclined north	1. 40 2. 15 3. 100
6a. Bóbrka b. Wietrzno c. Równe d. Rogi		II–III. Ciężkowice sandstones. Thickness, sandstone series: I, 120 m.; II, 50 m.; III, 50 m., with 20–30% oil sands	In western part, Cretaceous sandstones, IV horizon	Fold 25 km. long, inclined north, refolded at some points and broken by groups of faults	1. 60 2. 10 3. 200
7a. Lubatówka, Iwonicz b. Klimkówka-Wólka, c. Rudawka Rymanowska	c. Krosno beds	II–III Ciężkowice sandstones (Main horizon, III) Thickness, sandstone series: I, 150 m.; II, 90 m.; III, 60 m.; IV, 80 m. with 20% oil sand	Cretaceous sandstone (IV)	Unsymmetrical fold inclined north on sections *a* and *b*, and overturned on section *c*. On this section, Krosno beds covered by menilite slates and Eocene beds of core of entire fold Fold-axis is most culminated at Wulka and dips NW. under oil fields at sections *b* and *a*. Fields on section *b* flooded by top water and contamination averages 60%. On section *a* edge water is confirmed	1. 30 2. 20 3. —
8. Roztoki, Męcinka, Potok, Toroszówka, Białobrzegi, Krościenko, Niż. Haczów Trześniów		Ciężkowice sandstones I–II. I sandstone, gas horizon II gas and oil horizon. Thickness of sandstone series: I, 50 m. II, 30–80 m.	III sandstones only in Męcinka, Białkówka, Jaszczew	Diapiric and closed fold 40 km. long broken by transverse faults into separate blocks, some already flooded. Great fold in many places refolded into minor folds	1. 70 2. 10 3. 400 Width, producing area, 100–200 m.

MEDIAN ZONE

Depth of Wells (Meters)	Number Producing Wells Jan. 1, '33	Number New Drilling Wells 1932	Initial Production Kilograms	Early Prod., Cars, 1932	Number Wildcat Wells, 1932	Crude Oil: Density	Crude Oil: Quality	Remarks Yield Cumulative, Dec. 31. '32 Reserves Estimated, Cars
Kobylanka, 450; Libusza, Lipinki, 150–460; Kryg, 200–400	352	20	500–5,000	1,744	—	a. 0.857 b. 0.833	Paraffine (black oil) Lubricating (green oil)	a. Libusza, Lipinki b. Kobylanka, Kryg Yield, 31,855 Reserves, 15,000
a. 300 c. 630	149	a. 8 b. — c. 4	1,000 3,000	1,065	1*)	a. 0.885 Depth 372 m. b. 0.826 c. 0.822	Lubricating (paraf., 0.5%) Gasoline, 9–12% Some paraffine Gasoline, 16% Non-paraffine Gasoline, 24–42%	*) Ropita 24 at Harklowa: 1,009 m., Krosno beds: drilling At Sobniow among Harklowa fields and Potok-trend: one wildcat in 1931 stopped at 1,333 m. in lower Krosno beds Yield, 18,800 Reserves, 7,500
330–1,132	a. 29 b. 16 c. 21 d. 3 69	4	Wells N 53 at Równe, 10,000. Depth, 670 m.	1,532	2(*)	II, Rogi, 0.839 Równe, II, 0.859 Depth, 609 m. IV, 0.874	Non-paraffine Non-paraffine (0.30%) Gasoline, 33% Paraffine (from dipper horizon)	(*)At Załeże and Wola Dębowiecka on part of fold dipping NW.: drilling at 700 m. Yield, 69,600 Reserves, 14,000
a. 385–694 b. 250–560 c. 330–968	a. 17 b. 42 c. 3 62	— — —		a. 157 b. 165 c. 5		a. I, 0.920 0.950 II, 0.780 0.790 III, 0.820 0.840 b. 0.876 0.881 c. 0.843	Gasoline Lubricating Gasoline, 20.5% III sandstone Lubricating Gasoline, 20% Paraffine Gasoline, 6.5%	Yield, 23,700 Reserves, 8,000
700–900 920–1,123 Potok, 557–640 Krościenko, 300–500	129	7	Potok: only gas, 35 m.³/m. Toroszówka: 2 wells, edge water	2,130	1(*)	a. Potok: depth, 735 m., 0.822, depth, 1,050 m., 0.840 b. Krościenko: depth, 518 m., 0.888 c. Winnica: light oil d. Toroszówka: 0.790 0.700	Non-paraffine (0.23%) Gasoline, 16–17 and 35% Lubricating Lubricating (paraff., 0.3%) Gasol., 16% Non-paraffine Gasoline, 25% Non-paraffine Gasoline, 60, 54%	*) Wildcat at Roztoki: depth, 1,041 m. gas, 10 cubic meters per minute Closed pressure, 90 atm. Reserve gas on 20 hectares(?), 1 billion cubic meters Yield, 76,000 Reserves, 10,000

JASLO DISTRICT—

Oil Fields	Columnar Section and Oil Horizons: Oligocene — Krosno beds and menilite slates	Columnar Section and Oil Horizons: Eocene — Red and green shales with sandstones (Ciezkowice)	Columnar Section and Oil Horizons: Cretaceous — Black shales with sandstones	Structure	Area (Hectares) 1. Producing 2. Proved 3. Probable
9. Węglówka			Two horizons, at some points three (sandstones of Czarnorzeki)	Two parallel folds pinched out and inclined north, emerging in presumable tectonic window (inlier)	1. 52 2. 20 3. 50
10a. Zmiennica b. Turzepole c. Strachocina		Ciężkowice sandstones I–II	Sandstone of III horizon	Diapiric fold; in some places refolded; many transverse faults	1. 15 2. — 3. 350
11a. Starawieś b. Brzozów c. Humniska d. Grabownica e. Trepcza		Ciężkowice sandstone, only one horizon	Two sandstones	Diapiric narrow fold with many transverse faults	1. 40 2. 10 3. 200
12. Izdebki, Witryłów		Ciężkowice sandstone		Fold inclined north	1. 8 2. — 3. 500
13. Zagórz, Tyrawa Solna, Mokre (Tarnawa Dolna)	Sandstones in Krosno beds			Few pinched folds extending farSE.	1 20 2. — 3. 125
				Total Jasło District	1. 560 2. 155 3. 6,805

DROHOBYCZ DISTRICT

Oil Fields	Columnar Section and Oil Horizons: Oligocene — Krosno beds and menilite slates	Columnar Section and Oil Horizons: Eocene — Red and green shales with sandstones (Ciezkowice)	Columnar Section and Oil Horizons: Cretaceous — In some places, facies of Inoceramus beds	Structure	Area (Hectares) 1. Producing 2. Proved 3. Probable
14a. Wańkowa, Brelików, Leszczowata b. Ropienka c. Paszowa, Stańkowa	Few horizons in Krosno beds (lower) and menilite slates (upper)	Thickness of oil sands: a. 10–2 m. b. 12–2 m. c. 7–2 m.		Diapiric fold, with southern limb overturned south. Narrow (100–200 m.) producing area 12 km. long	1. 100 2. 80 3. 200
15a. Rajskie b. Polana and vicinity	Same			Few pinched folds inclined north	1. 16 2. 10 3. 300

MEDIAN ZONE (Continued)

Depth of Wells (Meters)	Number Producing Wells, Jan. 1, '33	Number New Drilling Wells, 1932	Initial Production (Kilograms)	Early Prod., Cars, 1932	Number Wildcat Wells, 1932	Crude Oil: Density	Crude Oil: Quality	Remarks Yield Cumulative, Dec. 31, '32 Reserves Estimated, Cars
150–300 Thirty horizon —450	82			387		Depth, 450 m., 0.867	Non-paraffine (0.44%) Lubricating Gasoline, 23%	Oil field flooded by top water. Yield, 24,600 Reserves, 7,000
360–510	30	b. 4	210–1,200	272	2 *)	a. 0.853 b. 0.861	Paraffine Non-paraffine	*) Strachocina, only gas; in 1932, 2,427,000 m.³ (reserve gas, 500,000,000 m.³). Yield, 8,000 Reserves, 2,000
300–985 1,003	a. 4 b. 5 c. 17 d. 26 52	a. 1 b. 1 d. 1	b. 1,400 d. 2,500	a. 287 b. 124 c. 213 d. 938 1,562	e. 1(*)	a. 0.725 b. 0.805 c, d. Depth, 564 m., 0.822	Non-paraffine Some paraffine Gasoline, 36% Non-paraffine Lubricating Gasoline, 35%	*) One wildcat at Trepcza, drilling Yield, 18,332 Reserves, 5,000
300–400	4			22	1*)		Paraffine Gasoline, 31%	*) Wildcat at Izdebki (Pionier): drilling, 854 m.
300–400	5	2	250–900	65		Light. Mokre: 0.812	Non-paraffine Gasoline, 43%	Yield, 15,630 Reserves, 100 (?)
	997	57		9,320	8			Yield, 288,317 Reserves, 75,600

—MEDIAN ZONE

Depth of Wells (Meters)	Number of Producing Wells, Jan. 1, '33	Number New Drilling Wells, 1932	Initial Production, (Kilograms)	Early Prod., Cars, 1932	Number Wildcat Wells, 1932	Crude Oil: Density	Crude Oil: Quality	Remarks Yield Cumulative, Dec. 31, '32 Reserves, Cars
200–400	a. 164 b. 71 c. 33 268	a. 6 b. 3 c. 5 14	a. 2,000–2,500 b. 130–3,200 c. 1,300–2,000	a. 1,549 b. 245 c. 139 1,933	1*)	a. 0.863 b. 0.872–0.844 c. 0.840 0.856 0.818	a. Paraffine (4.4–5.7%) Gasoline, 17% b. Paraffine (4.4%) Gasoline, 16–19% c. Some paraffine (0.6–0.9%) Stańkowa: lubricating Gasoline, 29%	*) Wildcat at Wańkowa (Brelików) on N. limb, dry (1,000 m.) Yield, 69, 826 Reserves, 16,000
300–400	8	b. 1	8,000	37		a. 0.786 b. 0.834	Non-paraffine Gasoline, 48% Paraffine Gasoline, 14%	Yield, 720 Reserves, 500

DROHOBYCZ DISTRICT—

Oil Fields	Columnar Section and Oil Horizons			Structure	Area (Hectares) 1. Producing 2. Proved 3. Probable
	Oligocene	Eocene	Cretaceous	Few complexes of folds inclined north and overthrust (Skiba in Polish)	
	1. Polanica beds (shales with sandstones) 2. Menilite slates with Kliwa sandstone and two series of hornstones. Under menilites, Boryslaw sandstone	3. Popiele beds (shales and sandstones) 4. Green and red shales with sandstones (upper Hieroglph beds)	5. Jamna sandstones 6. Inoceramus beds (shales, slates, and sandstones — lower Hieroglph sandstones)		
16. Starzawa, Stara Sól, Strzelbice		In sandstones of the series 4	In upper beds of Jamna sandstone	Two unsymmetric folds; southern overthrust on northern. Oil fields only on southern	1. 30 2. 10 3. —
17. Opaka		Sandstones of upper Eocene and two horizons in series 4		Pinched fold, steep dip of beds. Narrow producing area (100 m.)	1. 20 2. 10 3. —
18. Schodnica		In Eocene sandstones only weak horizons	Main horizon in Jamna sandstone (thickness—80 m.). Also Cretaceous sandstone	Unsymmetrical fold on extension of great transverse Boryslaw culmination. Fold squeezed in two complexes of slices (skiba)—from N. of Mraźnica (Orów), and from S. of Skole. Fold dips SE. and emerges NW. toward Opaka	1. 200 2. — 3. —
19. Urycz, Pereprostyna		Same	Same	Lengthening of Schodnica fold	1. 100 2. 50 3. —

DROHOBYCZ DISTRICT—

Oil Fields	Columnar Section and Oil Horizons			Structure	Area (Hectares) 1. Producing 2. Proved 3. Probable
20a. Boryslaw b. Tustanowice c. Mraźnica	Oil horizons in beds of overthrust (Inoceramus beds, I) and in any series of great deep fold (Polanica beds, II; menilite slates, III; main horizon Boryslaw sandstone, IV; upper Eocene, V; lower Eocene and Jamna sandstone, VI) Water horizons in Polanica beds (salt water in many places under high pressure), salt water in lower Eocene and Jamna sandstone Edge water in Boryslaw sandstone and Eocene beds encroaches from SE. and S. Thickness of oil sands: IV, 10–35 m., few 50–80 m. In S. part Mraźnica, Boryslaw sandstone is divided in two beds by slate beds (thickness, 3–9 m., few 19–21 m). Total thickness Boryslaw sandstone, 50–54 m. Porosity, productive sandstone: IV, 10.50–15.32%; V, 9.79–12.17%. Porosity, dry sandstone: IV, 5.29–6.34–8.53–15.80%; V, 3.94–4.32%; Jamna sandstone, 10.20%			Deep recumbent fold overturned N.; middle limb detached and thinning. Frontal bend of fold squeezed into Miocene salt, which in N. part of fold lies conformably on Polanica beds; in S. part lie unconformably (overthrust) packs of slices (skiba) of Orów and Marginale Max. deformation on line of great transverse culmination of Carpathians. S. limb of total fold is refolded in minor culminations and depressions. Deformations and difference in permeability of sandstones are shown by pools in one large field Entire structure complicated by few transverse faults: Popiele fault limits field on NW.; axis fold dips SE. From SE., partly from S. field completely flooded	1. 1,140 2. — 3. 300 at Orów
	Oligocene	Eocene	Cretaceous		
21a. Duba b. Rypne c. Perehińsko	In Kliwa sandstones three horizons			Two folds of menilite series overturned N. and overthrust by Eocene beds of marginal part of zone of slices (écailles)—Skole	1. 50 2. 30 3. 300
				Total Drohobycz district	1. 1,656 2. 190 3. 1,100

MARGINAL ZONE

Depth of Wells (Meters)	Number Producing Wells Jan. 1, '33	Number New Drilling Wells, 1933	Initial Production (Kilograms)	Early prod., Cars 1932	Number Wildcat Wells, 1932	Crude Oil: Density	Crude Oil: Quality	Remarks Yield, Dec. 31, '32, Cars Reserves, Cars
250–300	38	2	1,000–6,000	358 (only Strzelbice)		0.862 0.872	Paraffine (6.2–6.6%) Gasoline, 14–18%	Yield, 7,115 Reserves, 3,000
350–750	5			58		0.835 0.808–0.817	Paraffine Gasoline, 25% Gasoline, 30%	Yield, 1,500 Reserves, 1,000
204–230 at axis culmination and 500–1,000 m. on S. limb	366	5	1,500–2,400	3,616		a. 0.826 0.829 0.839 b. 0.867 0.871 c. oil from Inoceramus beds, 0.808	Non-paraffine (0.23%) Gasoline, 29–34% Lubr. (0.23%) Gasol. (13–23, 31%) Paraffine	NW. part of fold SE. part of fold Yield, 203,935 Reserves, 40,000 At Schodnica, air and gas lift successfully commenced
300–450	139	1	3,400	826		Depth, 356 m., 0.874 0.887	Lubricating (paraf., 0.15%) Gasoline, 20–24%	Yield, 43,470 Reserves, 7,000

MARGINAL ZONE (Continued)

Depth of Wells (Meters)	Number Producing Wells, Jan. 1, '33	Number New Drilling Wells, 1932	Initial Production (Kilograms)	Early Prod., Cars, 1932	Number Wildcat Wells, 1932	Crude Oil: Density	Crude Oil: Quality	Remarks Yield, Dec. 31, '32, Cars Reserves, Cars
a. IV, 1,300–1,500 V, 1,600–1,700 b. IV, 1 200–1,400 V, 1,400–1,500 c. IV, 1,550 V, 1,700–1,800 I 160–960 (in overthrust)	a. 132 b. 223 c. 133 488 and gas wells only	a. 2 b. 6 c. 7 15 and wells only in dipping	a. 5,000–8,000 b. dry c. 4,500–24,000	a. 8,533 b. 11,516 c. 12,980 33,029 c. shallow wells 205 33,234	4*)	a. IV, depth, 1,472 m., 0.850 b. IV, depth, 1,356 m., 0.852 c. IV, depth, 1,454 m., 0.860 c. III, 1,699 m., 0.869	Paraffine, 8.9% Gasoline, 19.20% Paraffine, 9.6% Gasoline, 20.68% Paraffine, 9.3% Gasoline, 17.27% Paraffine, 7.7% Gasoline, 16.54%	*)1. Stateland South: 2,085 m.; upper Eocene; edge water 2. James Forbes: 2,030 m.; upper Eocene; edge water 3. Minister Kwiatkowski: 1,700 m.; under overthrust in lower Polanica and menilite; gas and oil (10,000 kg./day) 4. Orów on tectonic unit SE. from Boryslaw: 1,738 m.; Polanica beds, under overthrust Yield, 2,316,480 Reserves, 300,000
Old fields, 150–300 New fields, 500–600, 700–856	a. 27 b. 76 c. 2 105	a. 1 b. 2	dry dry	a. 521 b. 1,404 c. 5 1,930		0.841 0.838	Non-paraffine Gasoline, 22%	Yield, 21,350 Reserves, 28,000
	1,417	41		41,992 Other small pools, 54 42,046	5			Yield, 2,664,396 Reserves, 395,500

Stanislawow District—

Oil Fields	Columnar Section and Oil Horizons: Oligocene	Eocene	Cretaceous	Structure	Area (Hectares) 1. Producing 2. Proved 3. Probable
	1. *Salt formation and Polanica beds* 2. *Menilite slates with few beds of Kliwa sandstones*	3. *Green shales with beds of sandstone* 4. *Sandstones and limestones* 5. *Green and red shales* a. *Quartzitic sandstones (upper hieroglyph beds)*	6. *Jamna sandstones* 7. *Red plat beds (shales)* 8. *Inoceramus beds (shales and sandstones)*		
22a. Majdan, Rosólna, Kryczka		Two (I–II) horizons in beds 3. Thickness of series: I, 80 m.; II, 70 m.		Unsymmetrical fold of series 1–2–3–4 overturned north	1. 20 2. 20 3. 100
b. Bitków	In series 1, horizon I; in series 2, II, III, IV horizons. Thickness of sands: II, 5–12 m.; III, 3 m.; IV, 5–8 m.		In series 7, horizon o	Structure of two tectonic units: unsymmetrical fold of sheared series 1–5 (deep element) and great refolded overthrust of series 3–8. Longitudinal fault divides field into two parts: old field on N.; new field on S.	1. 100 2. — 3. 600
c. Pasieczna	Horizons II and IV		Horizon o in series 7–8	SE. lengthening of both Bitków elements. Old field is only on series 7–8. New field—section Chrobry	1. 70 2. — 3. 100
23. Słoboda Rungurska			In series 7–8, three horizons; III, main; thickness, sandstone series, 66 m.	Unsymmetrical fold overturned north; axis of fold plunges NW.	1. 100 2. — 3. —
24. Kosmacz			I–II–III horizons in series 8. Thickness, sandstone series: I, 10 m.; II, 30 m.; III, 20 (main horizon)	Unsymmetrical fold with axis plunging NW.	1. 10 2. — 3. 50
				Total Stanisławów District	1. 300 2. 20 3. 850
				Total Poland	1. 2,516 2. 365 3. 8,755

Subcarpathian

Drohobycz District Gas Fields	Columnar Section and Gas Horizons: Miocene, Middle	Miocene, Lower	Oligocene, Upper	Structure	Area (Hectares) 1. Producing 2. Probable
	1. *Cerithium beds, shales and sands (Pokucie beds)* 2. *Red marls with saliferous beds (Stebnik beds)* 3. *Series of gray shales and sandstones (Dobrotów beds)*	4. *Salt-bearing shales and clays (salt formation) with conglomerates of Sloboda Rungurska, Truskawiec*	5. *Polanica beds* 6. *Menilite series*	*At Carpathian marginal front many pinched folds overturned N., few S.; in middle of depression folds more gentle. According to some geologists, structure of saline-plug (dome) type also may be expected, independent of Carpathian folding*	
a. Daszawa	Thickness main gas horizon, 16 m.			Flat dome of beds of 2–3 series, with lengthening NW. Few salt-water horizons above main gas horizon	1. 160 2. Very great
b. Gelsendorf	Thickness, main gas horizon, 15 m.			Gas series belongs to Tortonian above Stebnik beds. Saliferous beds with potassium and common salts occur in 3 levels: (1) Cerithium beds; (2) Stebnik beds (middle Miocene); (3) lower Miocene (Helvetian)	1. 100 2. Great
c. Kałusz					

Marginal Zone

Depth of Wells (Meters)	Number Producing Wells, Jan. 1, '33	Number New Drilling Wells, 1932	Initial Production (Kilograms)	Early Prod., Cars, 1932	Number Wildcat Wells, 1932	Crude Oil: Density	Crude Oil: Quality	Remarks Yield, Dec. 31, '32, Cars Reserves, Cars
I, 180–260 II, 330–500	59	7	1,000	356		0.832–0.836	Lubricating Gasoline, 24–40%	Yield, 3,300 Reserves, 3,000
Old field, 500–1,000 New field, 900–1,500	100	3	2,000 12,000**)	2,812	1*)	Old field: depth, 715 m., 0.808 New field: depth, 1,155 m., 0.827	Paraffine (3.4%) Gasoline, 33% Paraffine (3.6%) Gasoline, 25%	*) In SE. part of old field deepening to 1,220 m.. unsuccessful. **) Dąbrowa (Małop.) N 52. Yield, 68,200 Reserves, 17,000
Old field 250–350 New field, 900–1,200	28	2	300–400	534		Chrobry 3: depth, 1,129 m., 0.810 Chrobry 4: depth 1,118 m., 0.838 Old field: 0.728	Paraffine, 2.34% Gasoline, 32% Paraffine, 4.91% Gasoline, 26% Non-paraffine Gasoline, 67%	Yield, 8,735 Reserves, 5,000 Gas field in southern part
200–320	50			212	1*)	Depth, 164 m., 0.850 Depth, 311 m., 0.839	Paraffine, 3.5% Gasoline, 22.5%	*) At Czarny Potok Pionier's wildcat: drilling, 846 m.; from 800 m. in Jamna sandstone; flooded Yield, 34,205 Reserves, 2,000
385–600	10			54		0.887	Non-paraffine Gasoline, 7%	Yield, 2,605 Reserves, 1,000
	247	12		3,968	2			Yield, 117,045 Reserves, 28,000
	2,661 in meters 58,478 (−21.5% from 1931)	110		55,596 (−11.7% from 1931)	15			Yield, 3,069,758 Reserves, 499,100

Depression

Depth of Wells (Meters)	Number Producing Wells, Jan. 1, '33	Number New Drilling Wells, 1932	Initial Production in m.³/m. and Pressure in Atmospheres	Early production 1932, in Thousand Cubic Meters per Minute	Number Wildcat Wells	Remarks
685–760	10	2	300 57–60 atm.	96,187	1*)	*) At Rachiń (Pionier): drilling at 836 m.; Stebnik beds
760–775	4	1	200 58 atm.			a–b. Reserves of produc. area about 4 billion cubic meters
					1*)	*) At Grabówka near Kałuszi preparation (Pionier)

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