zone of shearing, overturning, and impaired permeability found close to the fault plane, or because of re-entering the fault.

Forty-one wells are producing from a 300-acre area 2 miles long and averaging 1,200 feet wide. The pool is now producing a daily average of 7,600 barrels of 31° oil. Cumulative production to January 1, 1958, was 3,400,384 barrels.

(18) REVIEW OF CUYAMA OIL PROVINCE
R. K. Cross, Consultant

Cuyama, California's newest oil province, discovered January 1, 1948, has produced to June 1, 1958, 156,949,760 barrels of premium-grade crude oil valued at $471,000,000. Current production is about 42,000 barrels per day under controlled withdrawal.

Accumulations discovered so far have been confined to structural traps located on one structural trend. With one exception, they lie easterly of a prominent northwest-southeast-trending right-lateral fault zone of late Pliocene age. With one exception they are either partly or entirely concealed by major thrust faults of Quaternary age.

The productive trend roughly parallels a hinge position between a shelf area on the west and a depositional sag on the east. The depositional sag, elongate northwest-southeast, occupied a position in lower Miocene time somewhat similar to the existing Carriso Plains. It received in addition to other sediments, up to 13,000 feet of principally marine sediments of Oligocene and lower Miocene age as compared with none on parts of the shelf. Thick non-marine counterparts developed near the San Andreas rift and fanned out over a large part of the southeastern part of the province. The thick sedimentary section of the depositional sag was thrust westerly onto the shelf and hinge positions during the Pleistocene orogeny. Contemporaneously, a thick Cretaceous and Tertiary section on the southwest was thrust northeasterly over the shelf area. None of the anticlines on the hanging walls of the overthrusts is commercially productive to date. None of the known stratigraphic traps contains oil or gas.

It may be inferred from the evidence that the highly organic, marine shales of Mohnian, Luisian, and Relizian age may have yielded little if any hydrocarbons despite the appearance of satisfying the presumed requirements of source beds of oil and gas. The Soda Lake shale, Saucesian-Zemorrian age, may be the major source of hydrocarbon substances in this province. Its areal distribution with respect to structural traps may account for the prolific accumulation of oil in some traps and the absence of it in others. With one possible exception, accumulations of oil and gas in strata younger than upper Saucesian appear to be the result of leakage along fault planes from a common reservoir in the lower Miocene.

(19) NEW APPROACH TO DIPMETER COMPUTATION
T. H. Braun and G. Y. Wheatley, The Superior Oil Company

For some time the Superior Oil Company has been developing a simple electrical network analog instrument to calculate dip and strike from the Schlumberger continuous dipmeter logs. A new version of this instrument is described that is designed specifically for the CDM-P (poteclinometer) logs and it can be used with hole deviations up to 36°.

Every control on this instrument corresponds with one of the recorded parameters of the dipmeter log. It is thus easy to see the effect of any one parameter on the resolved dip and strike. The instrument requires no elaborate training in procedure, is portable, and can therefore be used at the well site if necessary to make on-the-spot decisions regarding further drilling operation after a dipmeter log has been run.

The rapidity with which the computations can be made also permits a larger number of levels to be computed. This frequently results in more accurate information and a considerable saving in computation expense.

(20) ALASKA—LEGAL CONSEQUENCES OF STATEHOOD
R. E. Patton, Shell Oil Company

I. Basis under Federal Laws (Mineral Leasing Act)
   1. As to uplands.
   2. As to water bottoms.
      Effects of 1958 Alaska Submerged Lands Act.

II. Lands Acquired by State of Alaska
   1. Upon statehood becoming effective.
   2. Under subsequent selections to be made by the State.
   3. Status of existing Federal government leases and lease applications (offers) on lands which go to the State.

III. Existing Alaskan Statutes Governing Oil and Gas Leasing.
   1. Territorial Land Acts.
   2. Problems arising under certain provisions; necessity of clarifying amendments.
   3. Regulations.

IV. Alaska State Leasing System and Federal Government Leasing System in Future Concurrent Operation
   1. Acreage quota provisions.
   2. State lease forms and provisions.
V. Wildlife Withdrawal Problem
   1. In general.
   2. As to presently existing lease offers.

(21) Regional Geologic Interpretations of Aeromagnetic Profiles of Selected Areas in Alaska

I. Zeitz, G. E. Andreason, and W. J. Dempsey, U. S. Geological Survey

Aeromagnetic traverses over some of the sedimentary basins in Alaska have been flown by the U. S. Geological Survey in order to obtain a better understanding of the regional geology and an estimate of the thickness of sedimentary rocks in these areas. The magnetic data are presented in the form of profiles.

The basin areas under investigation are Yukon Flats and the adjacent Kandik Segment, the Middle Tanana and the Susitna Lowlands north of Cook Inlet. In the Susitna area, the magnetic data delineate the contact between the rocks of the Talkeetna geanticline and the Alaska Range geosyncline on the northwest, and indicate that the north end of the Cook Inlet Tertiary basin is shallow. North-south profiles near the eastern edge of the Yukon Flats basin south of the Arctic Circle indicate the probable presence of near-surface volcanic rocks.

A long profile from Anchorage to Nome, across many of the major tectonic elements in Alaska, is also presented. Examination of this profile yields the following: (1) the west and east edges of the Talkeetna geanticline may be delineated; (2) the Alaska Range geosyncline, the Tanana geanticline, and most of the Kuskokwim geosyncline are magnetically featureless, indicating that the sedimentary section is thick or that the basement rocks are nonmagnetic; (3) there is no great thickness of sedimentary rocks under Norton Sound.

(22) Summary of Jurassic Stratigraphy of Alaska

M. V. Kirk, Shell Oil Company

Jurassic rocks are fairly wide-spread in Alaska and occur in southeastern, southcentral, and southwestern Alaska. They are also extensively exposed on the Alaska Peninsula and in northern Alaska.

The Lower Jurassic deposits consist predominantly of a volcanic sequence of submarine volcanic flows, agglomerates, and tuffs with associated interbedded clastic sediments and some impure limestones and marls. The Middle Jurassic deposits are characterized by siltstones and, to less extent, sandstones with some conglomerates. The Upper Jurassic deposits consist of siltstones, sandstones, and conglomerates.

Most of the Jurassic deposits contain molluscan fossils, particularly ammonites. The ammonite faunas contain genera and, in some instances, species which are identical with forms from the classic type sections of Europe. Correlation of the Alaska faunas with those of the European type sections indicates the presence in Alaska of all the European stages with the exception of the Bathonian. Within parts of the Middle Jurassic, it has been possible to recognize a number of the European zones.

The later Upper Jurassic contains few diagnostic ammonites. The chronology of this part of the section has been worked out by means of a study of the ubiquitous pelecypod, *Aucella* (=*Buchia*).

(23) Geophysical Exploration in Northern Alaska

John R. Woolson, United Geophysical Corporation

Nine seasons of geophysical work by United in Northern Alaska have resulted in considerable knowledge of how to work in this remote area. Geophysical operations in Northern Alaska are best conducted between February and late July. This is a result of weather and terrane conditions and the necessity of supporting isolated field camps. Gravity work in the area can be useful as an indication of pre-Cretaceous structure. Two examples of structure in the Cretaceous, Gubik (a known gas-producing area) and Kuparuk, a potential structure along strike with Gubik are illustrated. Some of the structural complexity of the foothills province is shown in the far west at Driftwood and the far east at Shaviovik.

A tentative reason for the extraneous waves resulting from shooting in ground ice is discussed. These waves are in nearly every case non-repetitive.