of the interval, 8,206–8,248 feet, recovered 68 barrels of 35° gravity oil in 4 hours, a 420 B/D rate. Side-wall samples in the lowermost Stevens sand interval, 9,475–9,664 feet, indicated this 125-foot thick net sand section to be oil stained but the interval was untested because of the washed-out condition of the hole. In the follow-up well, 84-23, this lower Stevens sand was found to be 120 feet thicker than in 15X-24. The lower Stevens interval from 9,455 to 9,545 feet was perforated and pump-tested and yielded an average of 100 B/D of 32° gravity oil, cutting 10% during an 8-day test period. Production from the upper Stevens zone was then commingled with the lower Stevens zone and flowed oil at an average of 450 B/D during the first month of production.

The upper Miocene-Stevens is a prolific oil-producer in many fields of the southern part of the San Joaquin Basin. The estimated ultimate is over 800,000,000 barrels. The Stevens sequence in this area is over 1,500 feet thick and as the many shale breaks are thin and facies changes abrupt, correlation in this unit is difficult even where wells are closely spaced. Recent oil discoveries in the lower Stevens have focused attention on the fact that localization of structural trends and stratigraphic changes at this horizon are commonly different from upper Stevens prospects. The Stevens sand is an arkose containing abundant acid igneous rock fragments and a kaolinitic matrix. The upper Stevens sands are typically medium- to coarse-grained and the lower Stevens sands are typically fine- to medium-grained with permeabilities averaging 200 md and 50 md, respectively. Individual sands within the Stevens may appear massive on the electric log but a study of cores reveals that these sands are made up of numerous, usually thin, graded beds. The lower Miocene and Eocene sandstones lack sufficient permeability and porosity to provide an economic reservoir.

The basement wildcat was planned to explore the Stevens (upper Miocene), the Media sands (middle Miocene), the Vedder sands (lower Miocene), and Eocene sands. Stratigraphic changes in the lower Stevens section and Eocene section were also considered in locating the 15X well. Eocene sands were topped at 15,540 feet with the base at 15,639 feet. A formation test of the Eocene in the interval, 15,560–15,650 feet, for 18 hours recovered water at 140 B/D rate. A formation test of the lower Miocene-Vedder in the interval, 13,090–13,165 feet, for 12 hours recovered water with a trace of oil at a 55 B/D rate. Basement was topped at well depth 15,718 feet. It should be pointed out that the planned total depth of the well was 15,000± feet although our seismologists advised that they were picking the uppermost possible basement reflection and that a second or third possible basement event might be more reliable. Prior to drilling, a depth of 15,800 feet was considered the maximum depth to basement. Similar experiences 2 miles north-northeasterly in Shell's Posuncula 1 at Strand dictated that this uppermost reflection event would probably be basement; however, this was not the case at 15X-24.

Several points of interest concerning the upper Stevens accumulation are: (1) the oil-water contact appears to be near the same level as in the Canal oil field, and (2) the low hydrostatic pressure which is approximately 1,000 pounds below virgin pressure suggests these sands are in fluid communication with the producing measures in Canal or Ten Section, or both.

This oil find is an example where detailed seismic shooting and study have defined a small, structurally closed accumulation in a densely prospected area. The actual areal extent and size of the oil reserves will need definition by development wells. Current estimates of the upper Stevens pool are that the accumulation will cover 300–500 acres with maximum height of oil column, 150 feet, and oil reserves of the order of 5 million barrels. There are insufficient data to predict reserves from the lower Stevens.

(17) Bridge Pool of South Mountain Oil Field

E. A. Hall, Union Oil Company of California
R. M. Grivetti, The Texas Company

The Bridge pool is south of Santa Paula, directly across the Santa Clara River from the city. It underlies the northwestern part of the South Mountain oil field and extends 1½ miles southwesterly beyond the productive limits of the old field. A one-mile gap, currently being narrowed, separates the Bridge pool from the Saticoy field. The pool was discovered by Texas-Union in late December, 1955, following the formation of a 560-acre 50/50 land pool, with The Texas Company as operator. The Shell Oil Company is also an operator, in partnership with General Petroleum Corporation.

Production is from Pliocene, upper Pico and middle Pico sands, the middle Pico being most prolific. The productive section consists of thick sands, locally conglomeratic, separated by minor clay shales and siltstones. Bridge pool wells penetrate Oligocene Sespe beds and a fault wedge of Miocene shale before reaching the Pliocene beneath the Oakridge fault.

Oil is trapped in beds dipping 70° northerly beneath the 69°–80° southerly dipping fault zone. Lateral closure is believed due to bowing against the fault plane, although the east and west limits have not been reached to prove this. Several deep tests in the 11,000–13,500-foot depth range have been disappointing due to tight sands and low pressures.

Directional drilling has been extensively used to maintain structural advantage, and to save location costs in a Citrus area. Several wells have been redrilled to get out of a variable thickness 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.