There may be temporary leveling-off periods in the demand for energy, principally oil and gas, such as the one we are now experiencing, but long-range estimates indicate a steadily increasing demand.

How long will we petroleum geologists be able to continue the rate of discovery we have maintained for the last 15 years? Does atomic energy offer a threat to our markets or will we welcome it as a supplementing source of supply? Are there other energy competitors?

When you realize 140 tons of uranium has been estimated to be the equivalent in energy of all the oil and its products consumed in the United States in one year, it is apparent that atomic energy ultimately will have a profound effect on the energy markets of the United States and the world. All estimates for the foreseeable future indicate that it will supplement and not replace oil and gas uses. Solar energy may eventually have far-reaching effects on our every-day lives. In this connection, much research is now underway and some very interesting results have already been obtained with a form of algae known as chlorella. Research on the production of fuels synthetically continues to make progress, especially in the oil shale field.

It seems safe to predict that the oil industry and we, as petroleum geologists, will be called upon to supply the increasing energy needs of our country for some time to come. While we have performed through the years a praiseworthy job, it has only been in the last 15 years that we have hit our stride. By the end of the 1930's geophysical prospecting, principally the reflection seismograph, was having its full impact on oil finding. At about this same time the geologists and geophysicists laid aside any misgivings they may have been harboring for one another and began to join in a cooperative effort that through teamwork has found in the last 15 years approximately half of the oil that has been discovered in our country since Drake drilled his well. Since there are no new methods in sight, such as surface mapping, core drilling, subsurface geology, torsion balance, and reflection seismograph, which as each became available as a tool in the past, gave us new hope and extended successfully our frontiers of exploration, we must rely upon a further intensification of our teamwork of the last 15 years to find new oil fields in old producing areas, to push our exploration deeper into structural basins, to pioneer entirely new sedimentary areas of promise, and to develop the tidelands of our coasts. The job of keeping our country supplied with energy will be tremendous but we can accomplish it.

5. FRANK B. CONSELMAN, Consulting Geologist, Abilene, Texas. Oil and Gas Production from Carbonate Reservoirs

Non-reef carbonate reservoirs include some of the most famous and prolific oil and gas reservoirs in the world, despite the relative emphasis on reefoid masses in recent research and development programs. Approximately 20–25 per cent of the world's reserves are believed to be contained in non-reef carbonate rocks.

For general purposes, carbonates are classified broadly as of chemical, evaporative, biochemical, organic, and clastic origin, with examples cited. Although there are classic examples of limestones and dolomites which preserve their lithologic and stratigraphic character for thousands of square miles, probably the majority will exhibit some type of facies differentiation within relatively short distances, both vertically and horizontally. These facies changes provide excellent stratigraphic trap possibilities, even in non-reefed rocks.

Oil and gas reservoirs in carbonates may be caused by the structural deformation of rocks having widespread, relatively uniform, intergranular porosity; by the development of fracture and fissure systems at favorable positions with respect to fluid migration; and by permeability pinchouts in connection with facies changes.

Potentialities of carbonates as oil sources are not fully understood, but oil in minor quantities at least may be generated from certain facies.

Development practices in carbonate reservoirs are influenced by the characteristic irregularity of pore space, the chemical sensitivity of the rock to both natural and artificial leaching, and such physical characteristics as structural strength, rigidity, and competency. Although internal differences from conventional sand reservoirs are marked, nevertheless it has been demonstrated that production histories of carbonate reservoirs provide almost identical patterns with sand reservoirs of comparable drive. Primary recovery estimates by volumetric methods necessarily contain large factors of error.

Secondary-recovery programs are proving successful in carbonate reservoirs as well as in sands, but the effect of fracturing and channeling must be considered to avoid by-passing large reservoir volumes. Reservoir-heating techniques may be proved to be applicable.

In future prospecting, applied sedimentology may have as large a field in the carbonate rocks as it has had in the clastics. Practical "trendology" will also be useful, in addition to the conventional fold-finding techniques which have dominated exploration methods in the past.

6. W. H. TWENHOFEL, retired, Orlando, Florida. Environments of Deposition of Calcareous Sediments

Calcareous sediments are defined, but it is shown that sediments of calcareous composition enter into most deposits of all kinds of marine sediments. The fundamental condition controlling accumulation of calcareous sediments is that the sites of deposition are free from entrance of considerable quantities of muddy and sandy sediments but such condition does not insure that calcareous sediments will be deposited. Calcareous sediments are precipitated in many ways; some chemical, some physico-chemical, and, most important generally, organic. Organic precipitation is done by both plants and animals, the latter generally readily identified, the former generally indeterminate. Sea bottoms beneath shallow marine waters and protected against entrance of muddy and sandy sediments either because provenances of the sediments are unable to supply such either by reason of being very low or the surface being excellently protected by vegetation, or the sites of deposition being a long way from shore, are the environments that permit the accumulation of widespread deposits of shallow-water marine calcareous sediments. Elevated places on bottoms beneath shallow marine waters may permit calcareous sediments to be deposited in the midst of muddy and sandy sediments. Deep bottoms so far from land that muddy and sandy sediments do not commonly enter are also places of deposition of calcareous sediments.

7. DAN E. FERAY and WILLIAM A. JENKINS, Magnolia Field Research Laboratories, Dallas, Texas. Carbonate Facies of Pennsylvanian Sediments, North Central Texas

Two large limestone masses, in the Canyon series of the Pennsylvanian, crop out in north-central Texas. One of these masses crops out in Wise County and has been referred to as the Chico Ridge reef, the other crops out in Palo Pinto County and has been referred to as the Possum Kingdom reef. During the past 3 years these two limestone masses have been the subject of detailed surface mapping, sampling, coring, and laboratory analyses. Both of these limestone masses change laterally into equivalent shale and sandstone. The surface and subsurface evidence indicates that these two bodies of limestone are of non-reef origin. These limestone masses are examples of stratigraphic-trap carbonate reservoirs.

8. CHARLES A. RENFROE, Columbian Carbon Company, Amarillo, Texas. The Novinger Pool

The discovery well of the Novinger pool was drilled in the latter part of November, 1950, on the T. B. Novinger lease, Sec. 26, T. 33 S., R. 30 W., Meade County, Kansas. At the present time 32 wells have been drilled, of which 27 produce from the Marmaton, 3 from the Morrow, 1 from the Chester, and 1 gas well from the Atoka. Initial potentials on the wells range from 2,204 to 49 barrels of oil per day. The average monthly production of the field is 42,000 barrels of oil. Total accumulative production to the first of August, 1953, is approximately 475,000 barrels of oil. Most of the oil produced is from a porous limestone of Marmaton age. This reservoir is an elongate reef-like body with a north-south trend. Lithologically, it is a relatively coarse textured oölitic limestone with a large percentage of organic debris. The northern limits of the field have been delimited by three wells that cored dense shaly limestone in the stratigraphic interval represented by the Novinger pay on the south. The southern limits of the field are not known. Pay from the Atoka is from a relatively tight shaly sandstone of erratic distribution that apparently marks the Morrow-Atoka unconformity. A small amount of gas has been found in the Atoka. Morrow production is from lenticular sands that occur at various levels throughout the Morrow interval. Although 12 wells have been drilled through the Morrow, only 3 in the north end of the pool have had sufficiently well developed sands to be commercial. These 3 are all oil productive with fairly high gas-oil ratios. Chester production is from porosity developed in coarsely-crystalline crinoidal limestone at or near the Pennsylvanian-Mississippian boundary. Porosity appears to be secondary and was probably developed by weathering of the Chester limestone during the post-Mississippian-pre-Pennsylvanian erosional interval. Only one well is now producing from the Chester, but another was gauged at 14,000,000 cubic feet of gas per day with a spray of oil before it was completed higher in the hole as a Marmaton producer. No wells have been drilled through the Mississippian.

9. EARL MCCRACKEN, Missouri Geological Survey, Rolla. Correlation of the Insoluble Residue Zones of the Upper Arbuckle of Missouri and Southern Kansas

Insoluble residues are used in the Canadian (upper Arbuckle) of Missouri to segregate diagnostic residues and zonal units and to establish, by zonal sequences, the composite order of superposition within formations.

The standard pre-St. Peter geologic column of Missouri, based on residue zones, may be used in Kansas as well as other Mid-Continent states by residue methods.

10. WALLACE LEE, State Geological Survey of Kansas, Lawrence. Thickness Maps as Criteria for Regional Structural Movements

A map, recording the thickness of a sequence of rocks between surfaces that were once flat or relatively flat, records the structural movements that occurred between the development of the limiting surfaces. Such an isopachous map is essentially a structure map of the first surface at the time of the second. The accuracy with which such maps reveal the structural movements that took place during the interval depends on how closely the limiting surfaces approached a plane. They are most accurate where the confining surfaces were depositional. Beveled erosional surfaces are useful where