

PETROLÜN BİRİNCİ VE İKİNCİ GÖÇÜ

Birincil göç: Olgunlaşıp yağ/gaz zerrelere dönüşen petrolün şeyl ana kayacından atılması

Şeyller: çok gözenekli, fakat bileşenlerin küçük tane boyu yüzünden az geçirgen/geçirgen değil

*birincil göçün nedeni ana kaya üstündeki kayaçların ağırlığının yol açtığı basınçtır.

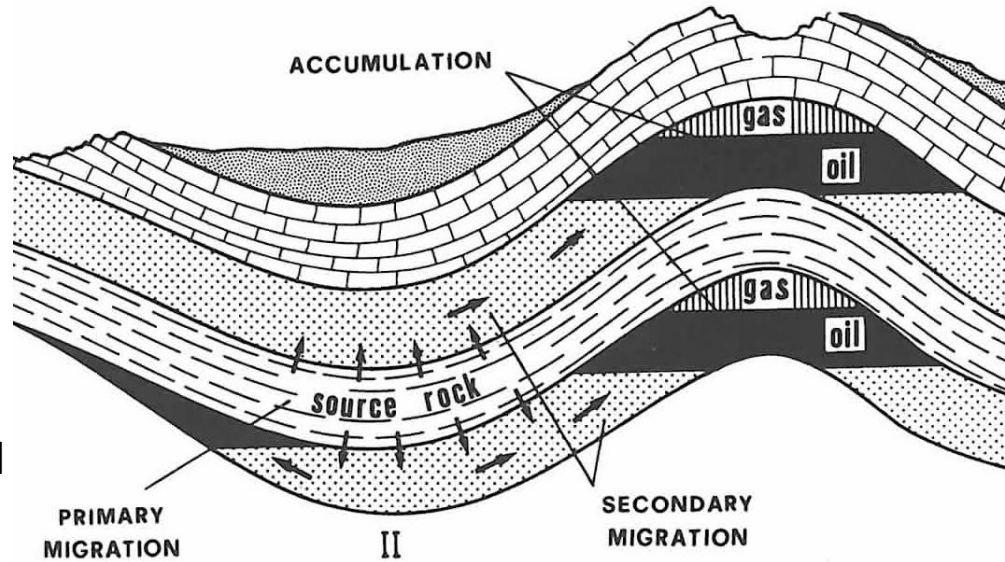
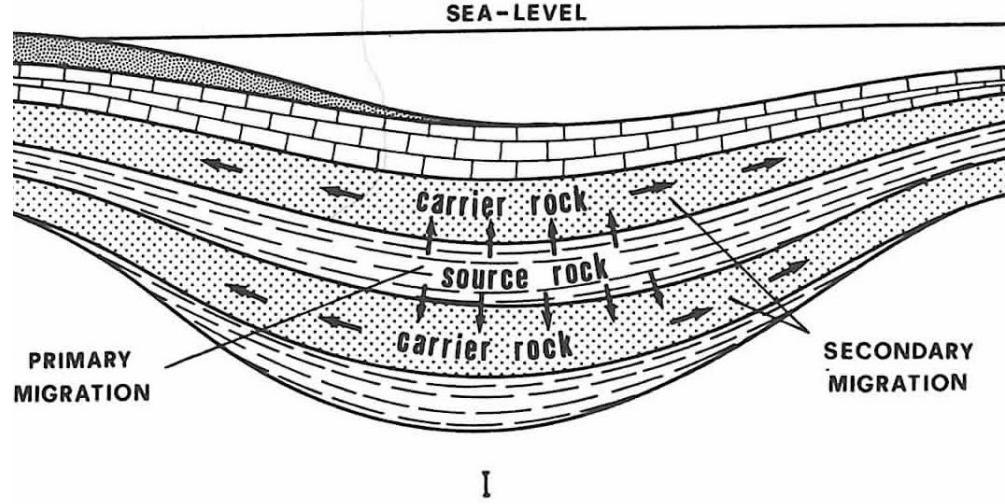
•Birincil göçte akışkan, şeylin alt ve üstündeki gözenekli kayaçlara doğru yöneliyor.

•Diyajenetik evrede petrolün yağ/gaz zerrelere dönüşümü 15-25 ka zaman alıyor

•Ana kayacın (şeyl istifinin) kalınlığı arttıkça (100'lerce m) merkezi kısmından suyun atılması zorlaşıyor.

•Ana kayaç ince (<50 m) ise suyu şeylden çıkaracak kadar güçlü bir basınç oluşmuyor; bu nedenle su (ve onunla birlikte yağ ve petrol zerreleri) şeyli terkedemiyor.

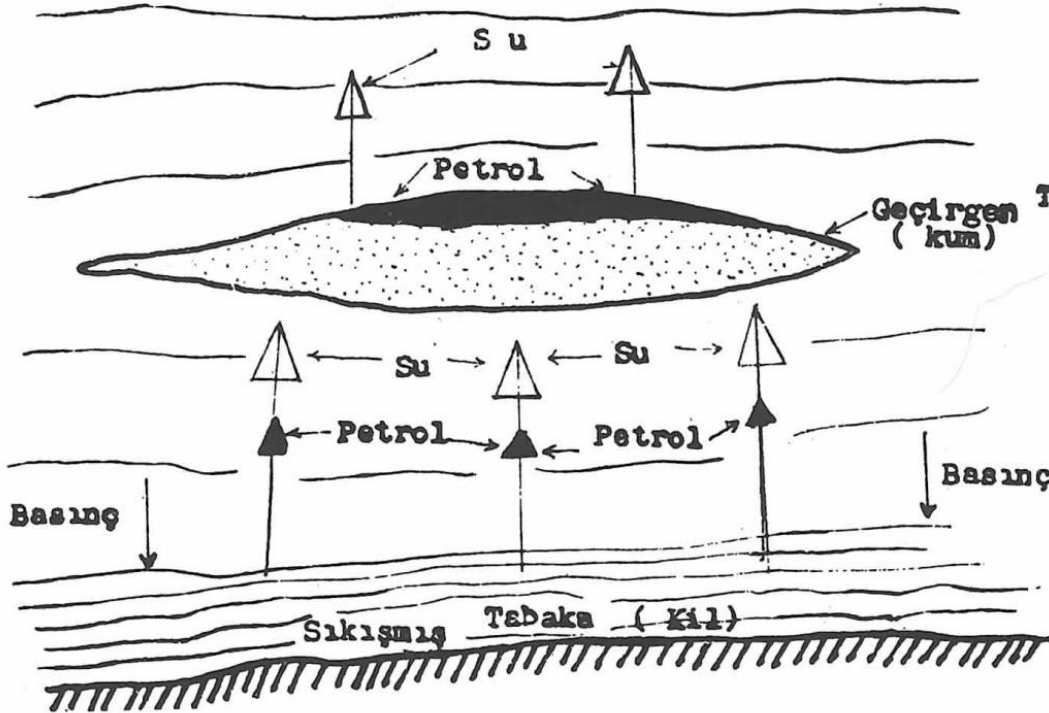
•Killerde gözenek suyunun %50'si 300-1500 m derinlikte; %75'i 700-2000 m derinlikte atılıyor/uzaklaştırılıyor.



* Birincil göçün gerçekleşebilmesi için, petrolün su atılmadan önce olgunlaşması (yağ ve gaz zerrelerine dönüşmesi) gerekir. Şayet olgunlaşma daha sonra gerçekleşirse petrol ana kaya içinde kalır; böylece bitümlü şeyller oluşur. Bitümlü şeyller, yerin derinliklerinde ancak özel tekniklerle ve pahalı olarak değerlendirilebilirler.

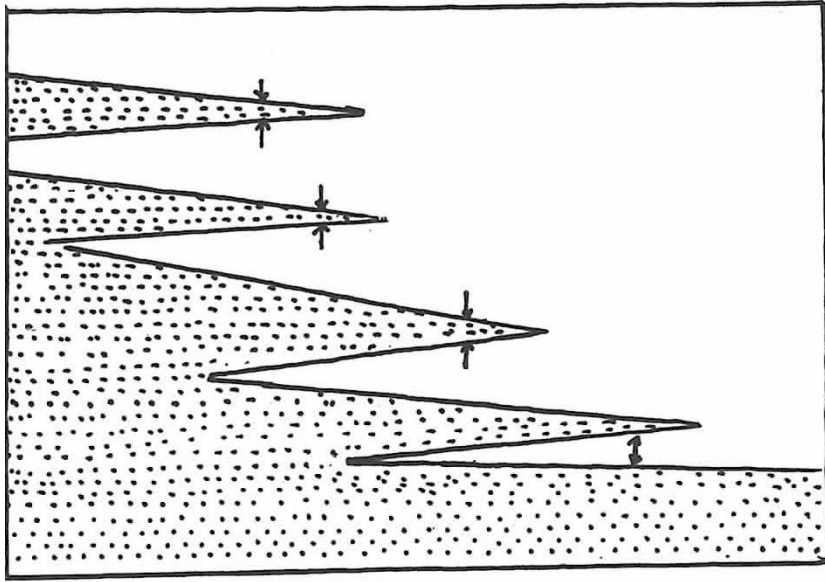
* Birincil göç, ana kayaç istifinin çok kalın olması durumunda da, ana kayacın merkezi kesiminde iyi gelişemez.

• Petrolün birinci göçünün başlamasından biraz sonra, kapanların oluşmuş olması gerekir. Aksi halde oluşan petrol hava ya da suya karışarak boşa gider.

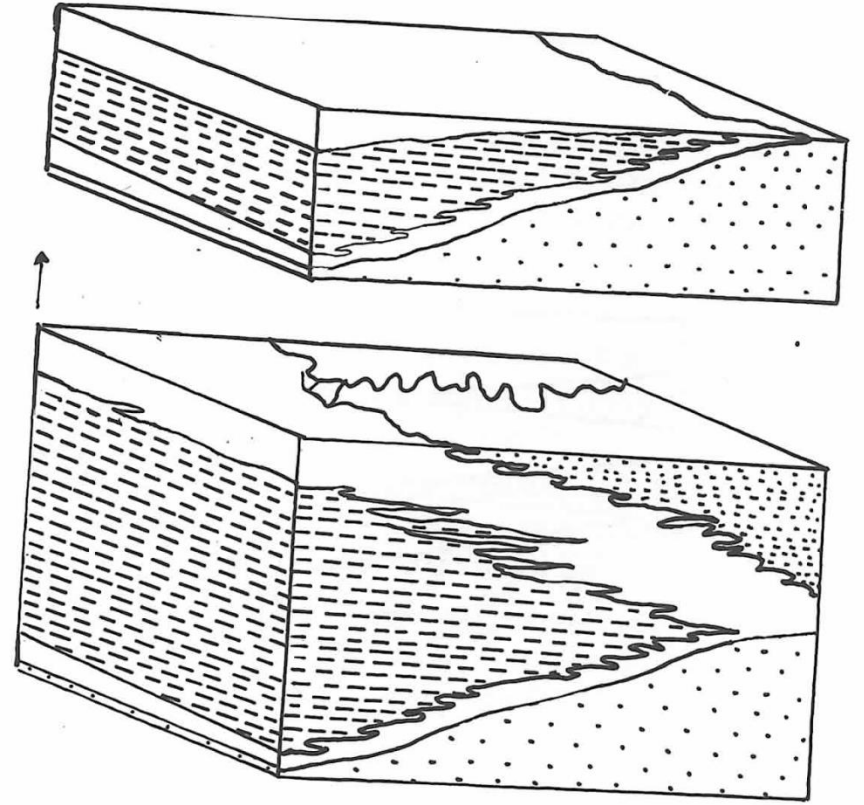


Şekil 5.2 Kompaksiyon (sıkışma) sırasında petrolün Şeyl'den Kum tabakasına geçişi (Göksu, 1983)

- Bu kořullarda, yapısal kapanların oluşmadığı durumlarda stratigrafik kapanlar önemli olabilir. Bu durumda ise istifin transgressif mi yoksa regressif mi olduğu önemlidir. Transgressif istif, yapısal kapanların oluşmadığı durumda stratigrafik kapan oluşturabilir.



Şekil 5.3 Regresif istif içinde yapılan enine kesit. (Beckmann,



Şekil 5.4 Transgressif istifin birikmesini gösteren blok diyagram (Beckmann, 1976)

PETROLÜN İKİNCİL GÖÇÜ

- Petrolün geçirgen kayalar içindeki yolculuğudur. Çoğu ikincil göç kilometrelerce, bazen 10'larca hatta 100 km olabilir.
- Çoğunlukla tabakalara paralel gelişir.

İkincil göçün boyutu ve yönü

Su eşliğinde ikincil göç

Petrolün sudan ayrı göç etmesi

Petrol ve Gazın birikmesi

Petrol-su düzleminin eğimi

Petrol ve gazın kapanda birikimi

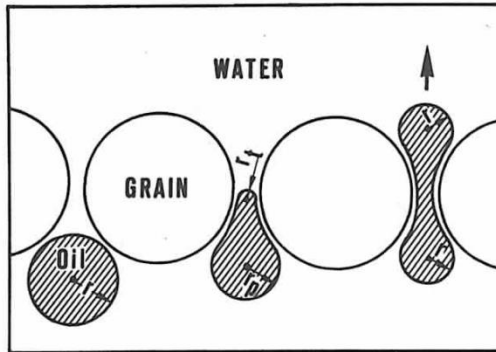


Fig. III.4.1. Transport of an oil globule through pore throats in a water-wet sub-surface environment. Capillary pressure opposes the buoyant force until the radius of curvature inside the distorted oil globule is equal at its lower and upper ends. (Modified after Berg, 1975)

$$p = \frac{2\gamma}{r} \quad \frac{2\gamma}{r_t} > \frac{2\gamma}{r_p} \quad \frac{2\gamma}{r} = \frac{2\gamma}{r}$$

Şekil 6.2 : Bir petrol damlasının bir gözenekten diğerine geçişi (Tissot ve Welte, 1984'den)

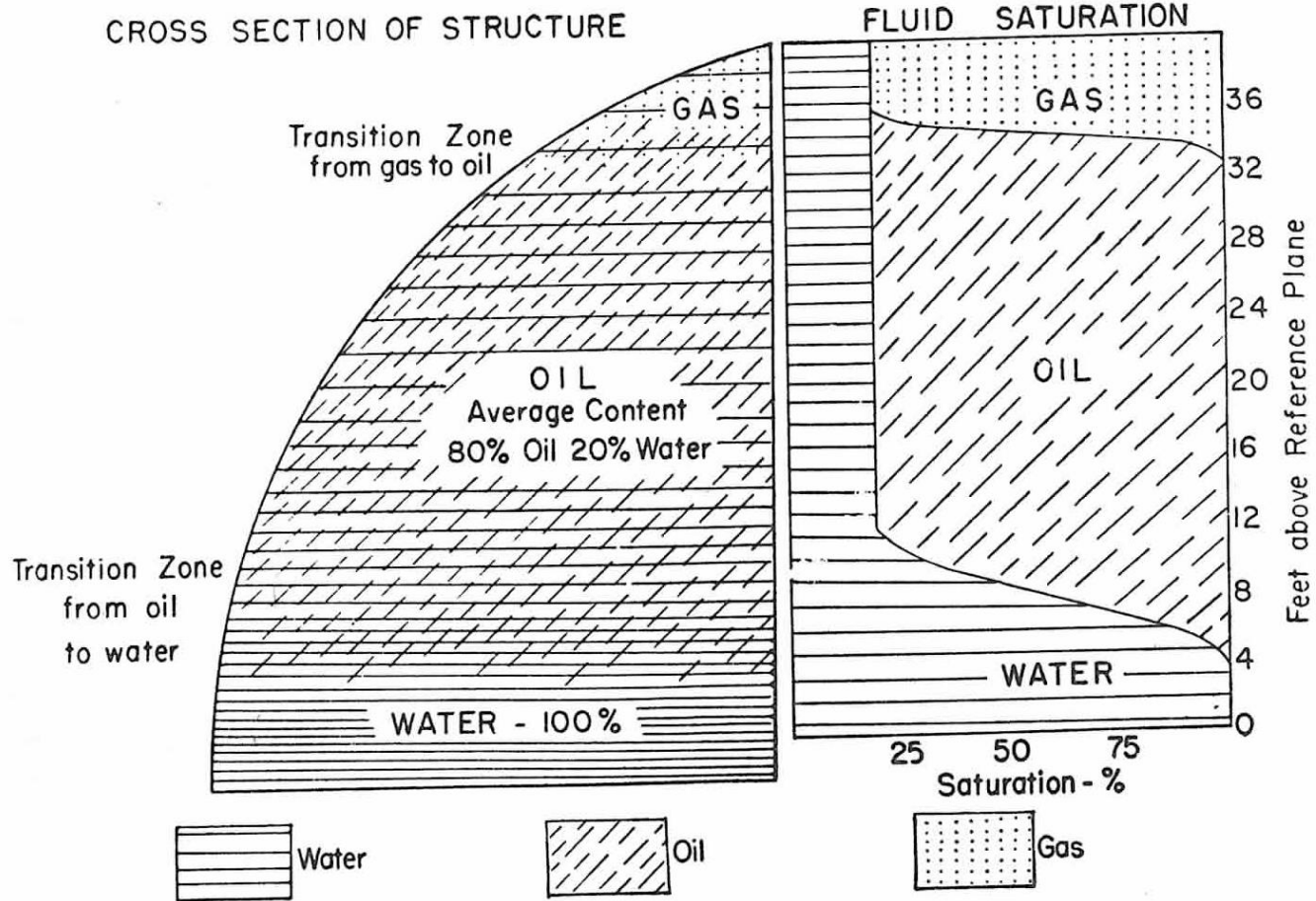


FIGURE 8-1 Diagrammatic section to show the relative positions of gas, oil, and water in a typical petroleum reservoir. [Redrawn from Jersey-Humble report, Committee on Reservoir Development and Operations (1942), p. 12, Fig. 2.]

Şekil 6.3 Tipik bir petrol kapaında bulunan gaz, petrol ve suyun konumları (Levorsen, 1958'de

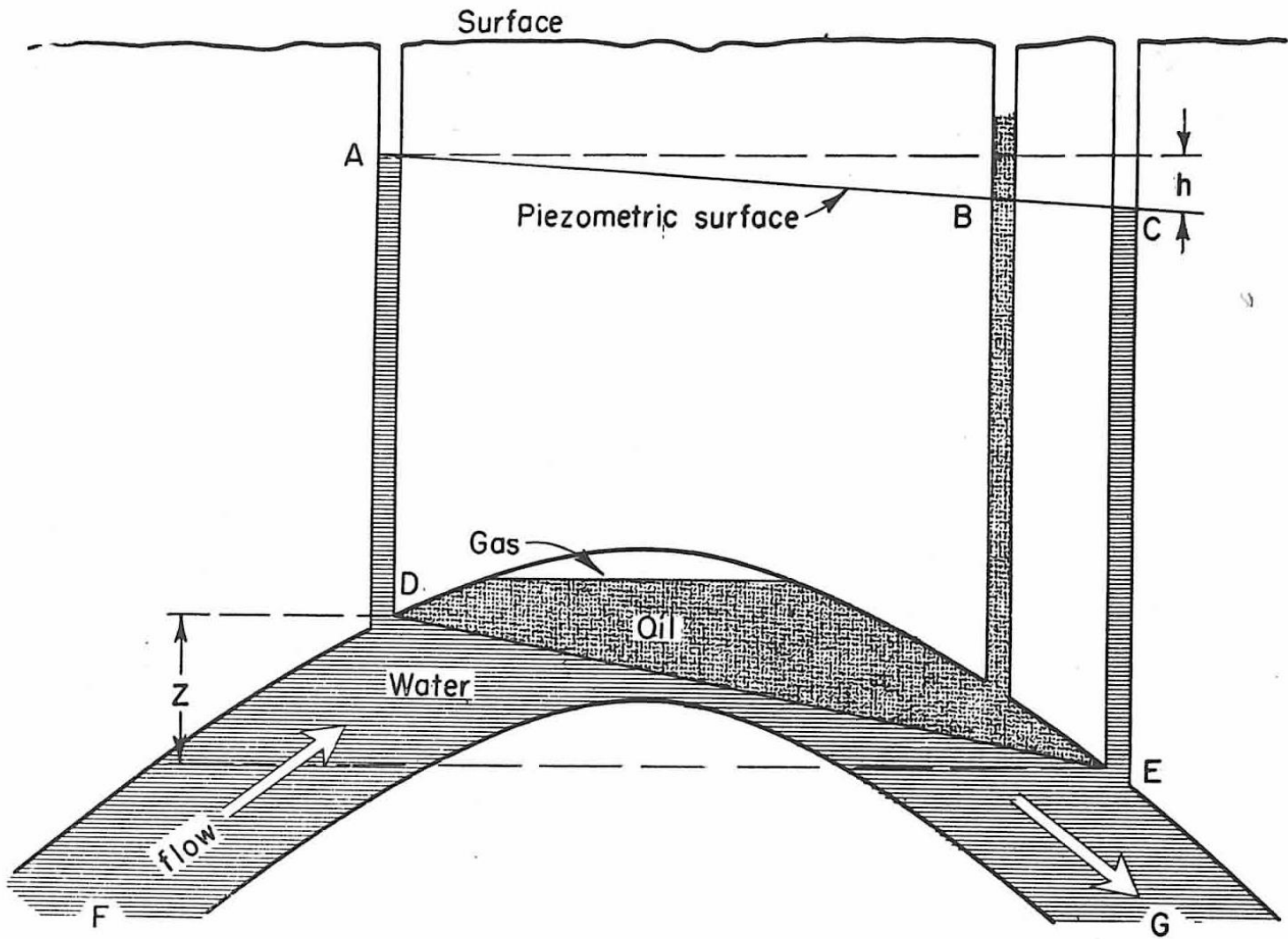
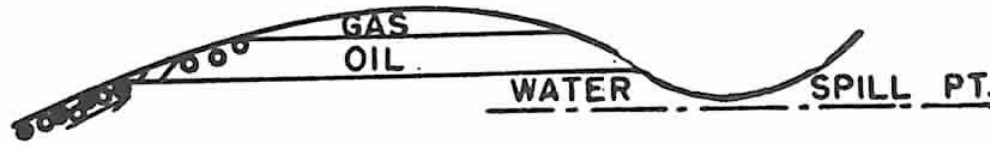


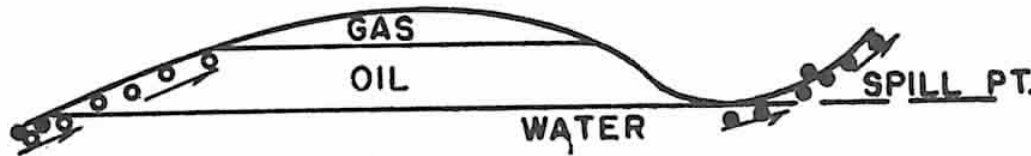
FIGURE 12-9 Diagrammatic section showing the relation of the slope of the oil-water contact to the slope of the piezometric surface.

Şekil 6.4 Su-petrol düzleminin eğimi ile pizometrik yüzeyin eğimi arasındaki bağıntı (Levorsen, 1958)

Stage 1



Stage 2



Stage 3

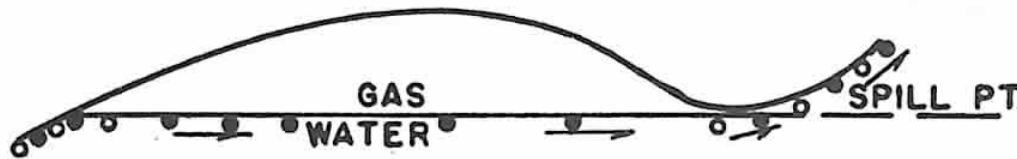


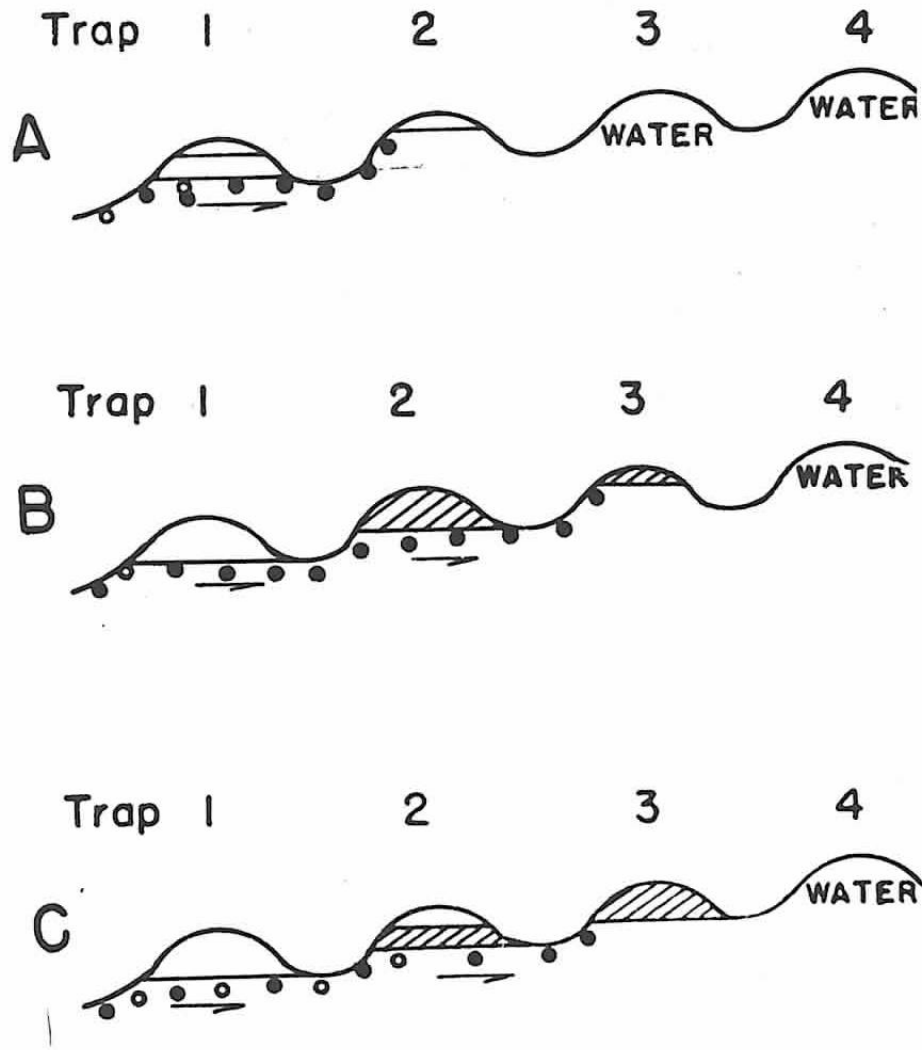
FIGURE 12-13

Diagram to illustrate the selective trapping of oil and gas. Stage 1: The oil and gas are above the spill point, and both will continue to be trapped until the free water is all displaced and the oil-water contact reaches the spill point. Stage 2: Gas continues to be trapped while oil spills out and goes on up the dip. Stage 3: Gas has filled the trap and spills out up the dip. Oil bypasses the trap and goes on up the dip. [Redrawn from Gussow, *Proc. Alberta Soc. Petrol. Geol.*, June 1953, p. 4.]

Şekil 6.6 Petrol ve gazın bir kapanda selektif olarak birikmesi (Levorsen, 1958'den)

FIGURE 12-14

In the series of traps at A, trap 1 is in the state of Stage 2 (Fig. 12-13): oil is being spilled out into trap 2. Traps 3 and 4 are full of salt water. In B, trap 1 has spilled all its oil into trap 2. Trap 2 is full of oil, and the excess is passing up the dip into trap 3. Trap 1 is full of gas. In C, trap 1 is unchanged, trap 2 has a gas cap (the excess gas coming from trap 2), trap 3 is full of oil, and trap 4 is still full of water but will be the next to be filled with oil spilling out of trap 3. [Redrawn from Gussow, Proc. Alberta Soc. Petrol. Geol., June 1953, p. 4.]



Şekil 6.7 Aynı hazne kayacın kıvrılmasıyla oluşan kapanlar serisinde petrol ve gazın selektif olarak birikmeleri (Levorsen, 1958'den)

KAPANLARIN SINIFLANDIRILMASI

Yapısal kapanlar

Kıvrımlarla ilgili kapanlar

(Domlar, çeşitli antiklinaller, gömülü tepeler)

Faylanma ile ilgili kapanlar

(normal ve ters faylar, bindirmeler)

Çatlaklarla ilgili kapanlar

Stratigrafik kapanlar

Birincil stratigrafik kapanlar

1-kırıntılı çökel fasiyesleri: kum mercekleleri, eski kum setleri, eski vadi dolguları

2-kimyasal çökel fasiyesleri: (gözenekli karbonatlar, resifler)

İkincil stratigrafik kapanlar

1- Diskordans düzleminin altında ve üstündeki kapanlar

Sıvı basınçlı kapanlar

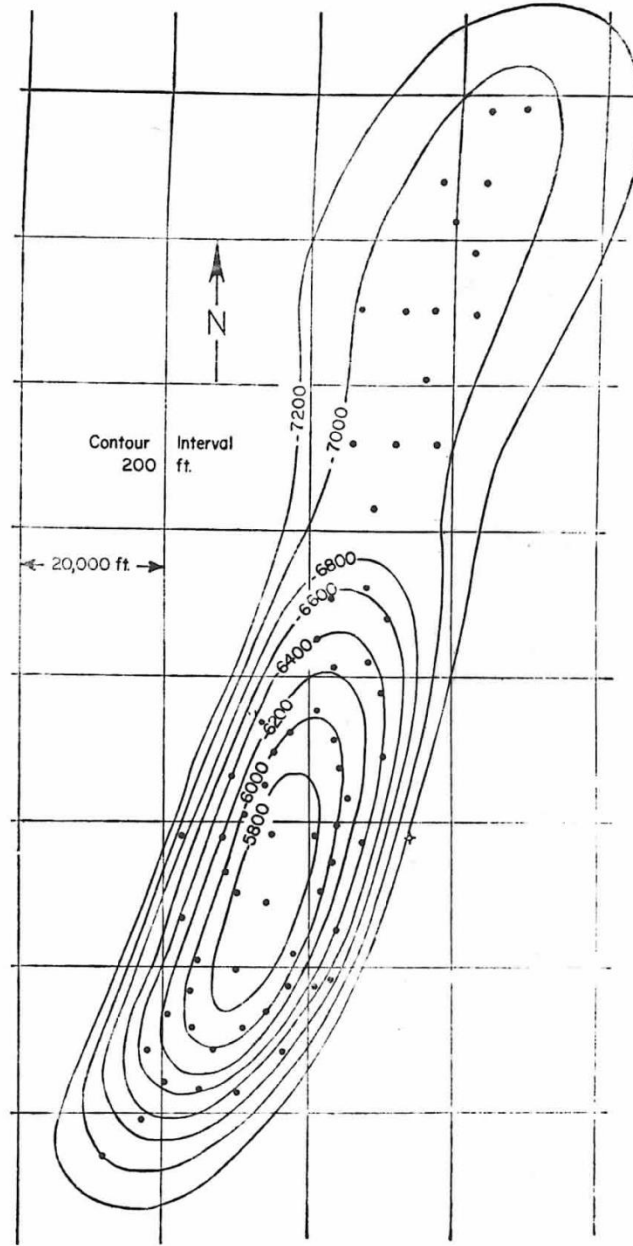
Bileşik kapanlar

1- yapı-stratigrafi kombinasyonu

2-tuz domlarındaki kombinasyonlar

FIGURE 5-6

Structure of the Jurassic oolitic and dolomitic producing formation, the Arab zone, in the Abqaiq pool of Saudi Arabia. This great pool is thirty miles long and six miles wide and has a maximum oil column of over 1,500 feet; the average initial production of the sixty-six wells was 17,000 barrels per day. [Redrawn from McConnell, O. & G. Jour., December 20, 1951, p. 199.]



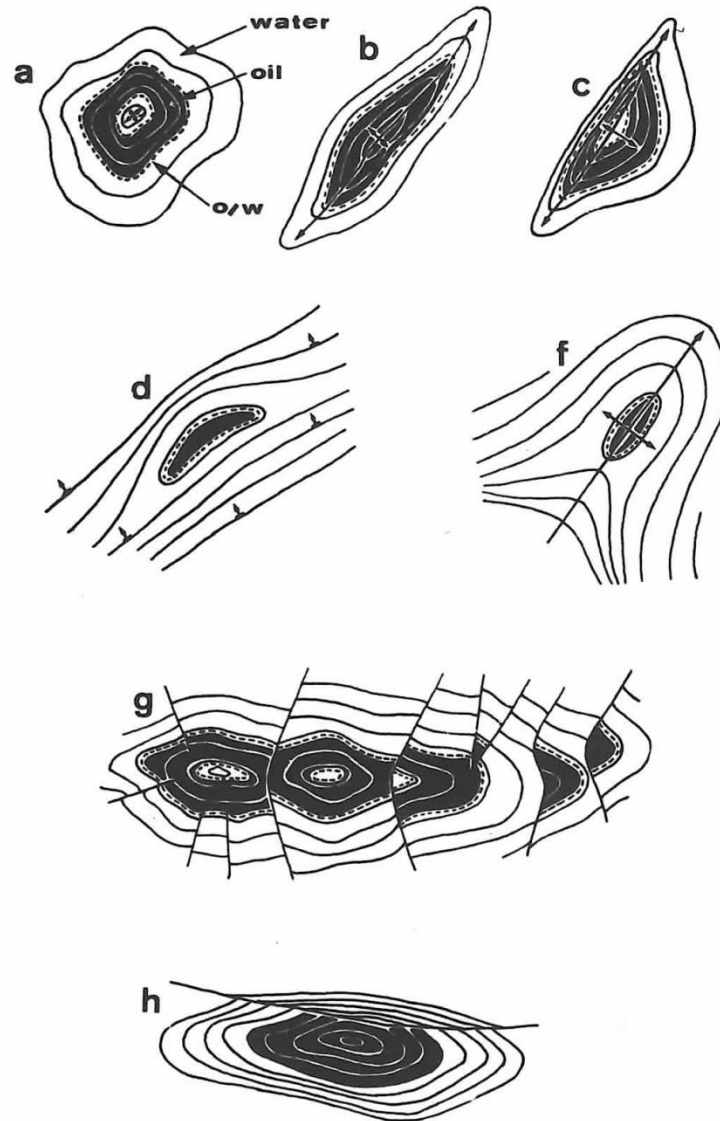


Fig. 28 Different types of anticlines. a) a normal, nearly regular anticline. b) a long, elliptical anticline. c) an anticline with unequal dip on both sides of its axis. d) a so called terrace. e) a so called balcony. f) a so called balcony. g) an elliptical anticline, complicated by some faults. h) an elliptical anticline with a fault running nearly parallel to its axis (After Flandrin).



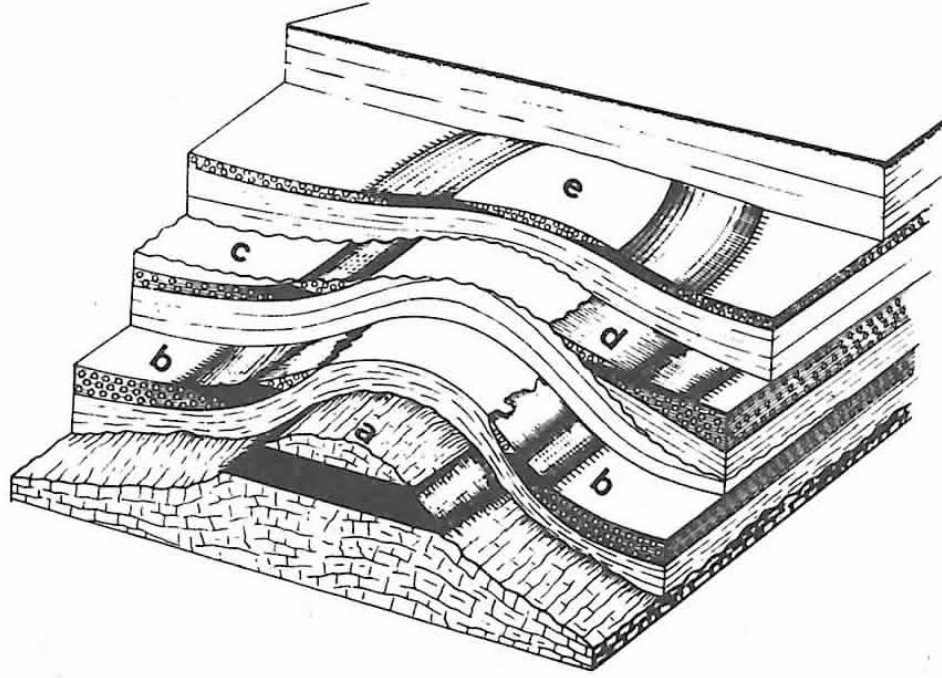


Fig. 39 Traps above and around a buried hill or a reef. a) Trap of anticlinal type within porous parts of the top of the hill or reef. b) Traps of the shaling out type along the flanks of the buried hill or reef. c) Trap below a disconformity. d) Overlap structure above a disconformity. e) Anticlinal type structure in sediments overlying the buried hill or reef.

Şekil 8.4 Bir gömülü tepeye ait kapanlar (tip A-3) (Beckmann, 1976)

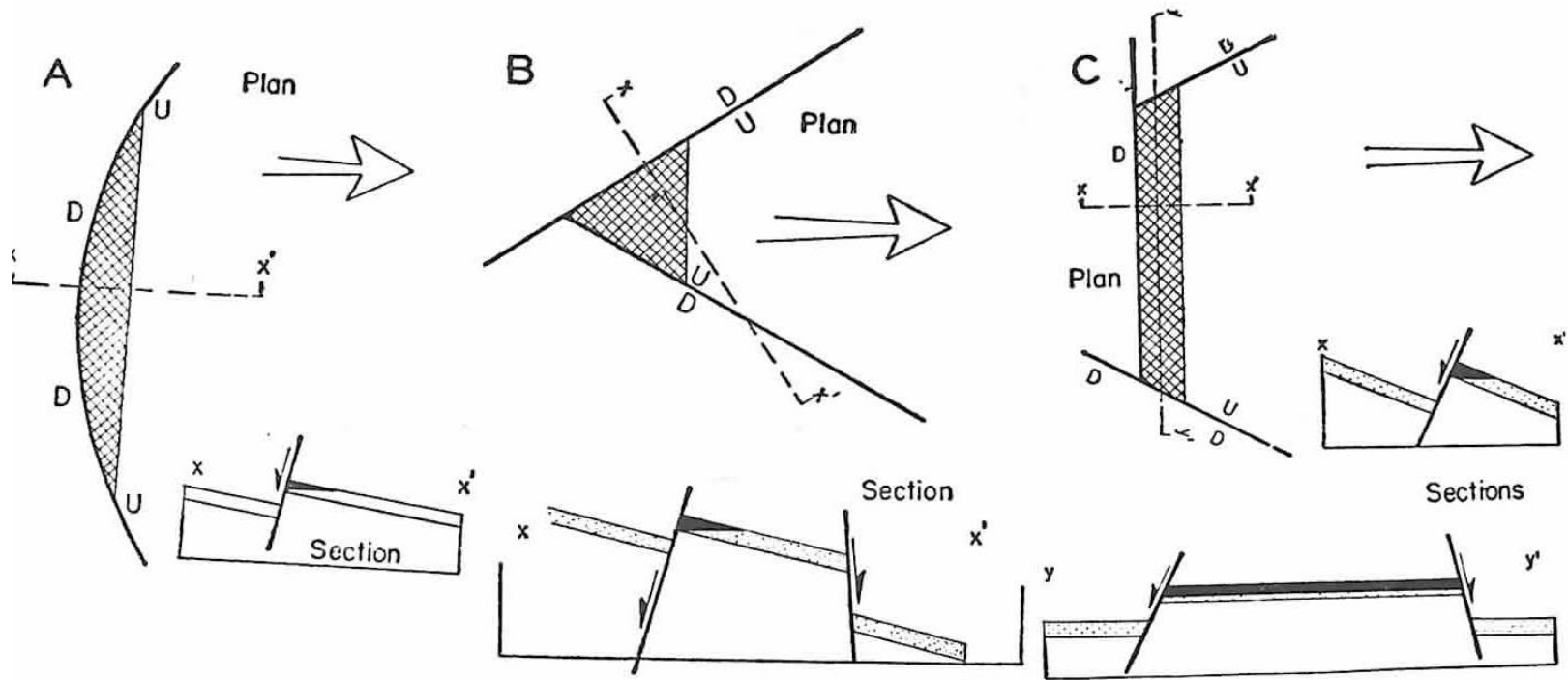


FIGURE 5-23 *Idealized diagrams showing characteristic traps formed chiefly by normal faulting, coupled with regional homoclinal dip: A, a trap formed by a single curved fault; B, a trap formed by two intersecting faults; C, a trap formed by several intersecting faults. Arrows show dip.*

Şekil 8.5 Normal faylı kapanlar (tip B-1) (Levorsen, 1958'den)

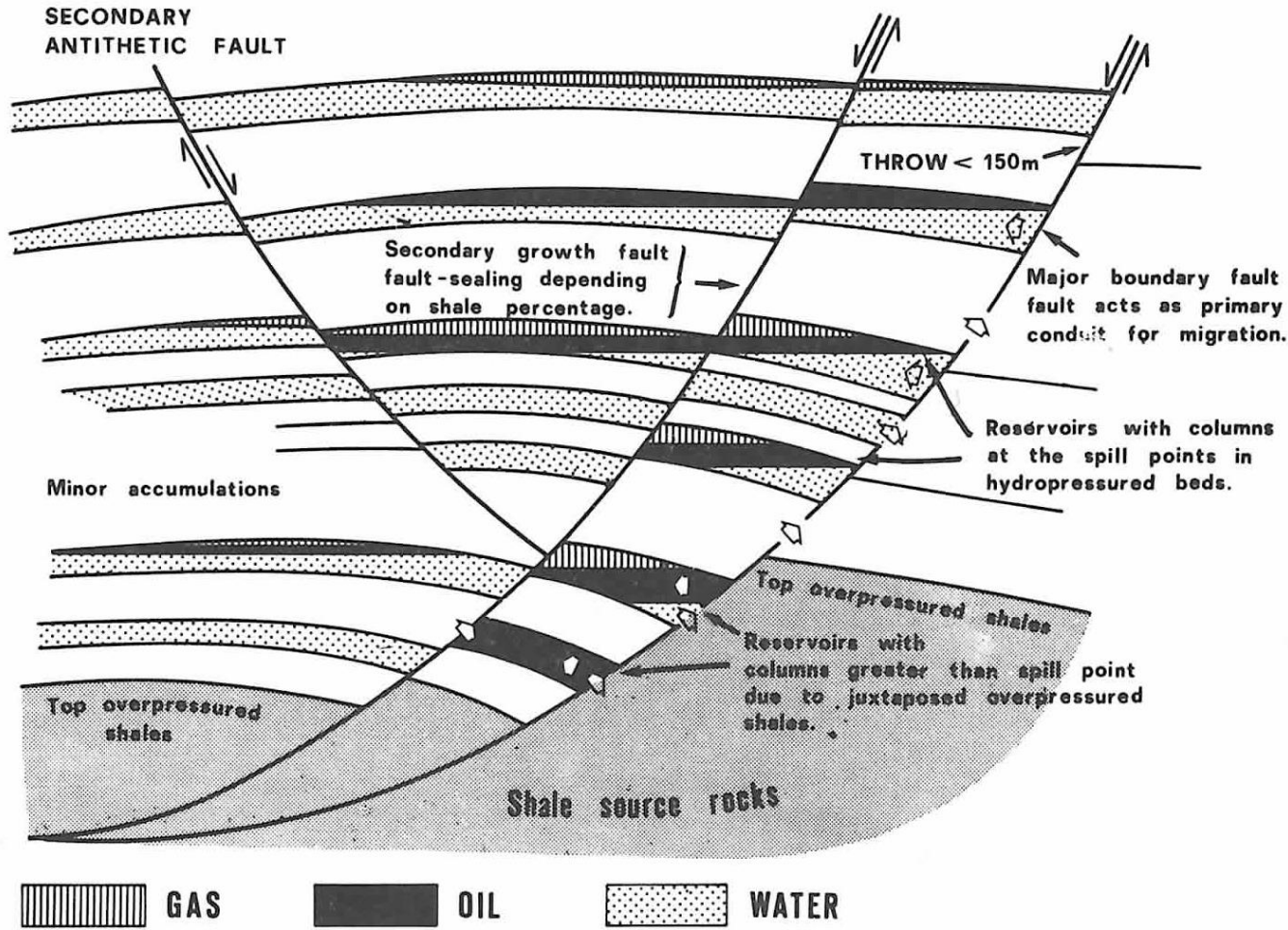


Fig. III.4.9. Section through growth fault in the Niger delta showing the position of various kinds of oil accumulations and possible avenues of migration between pools. (After Weber and Daukoru, 1975)

Şekil 8.7 Bir büyüme fayına bağlı kapanlar (tip B-1) (Tissot ve Welte, 1984'ten)

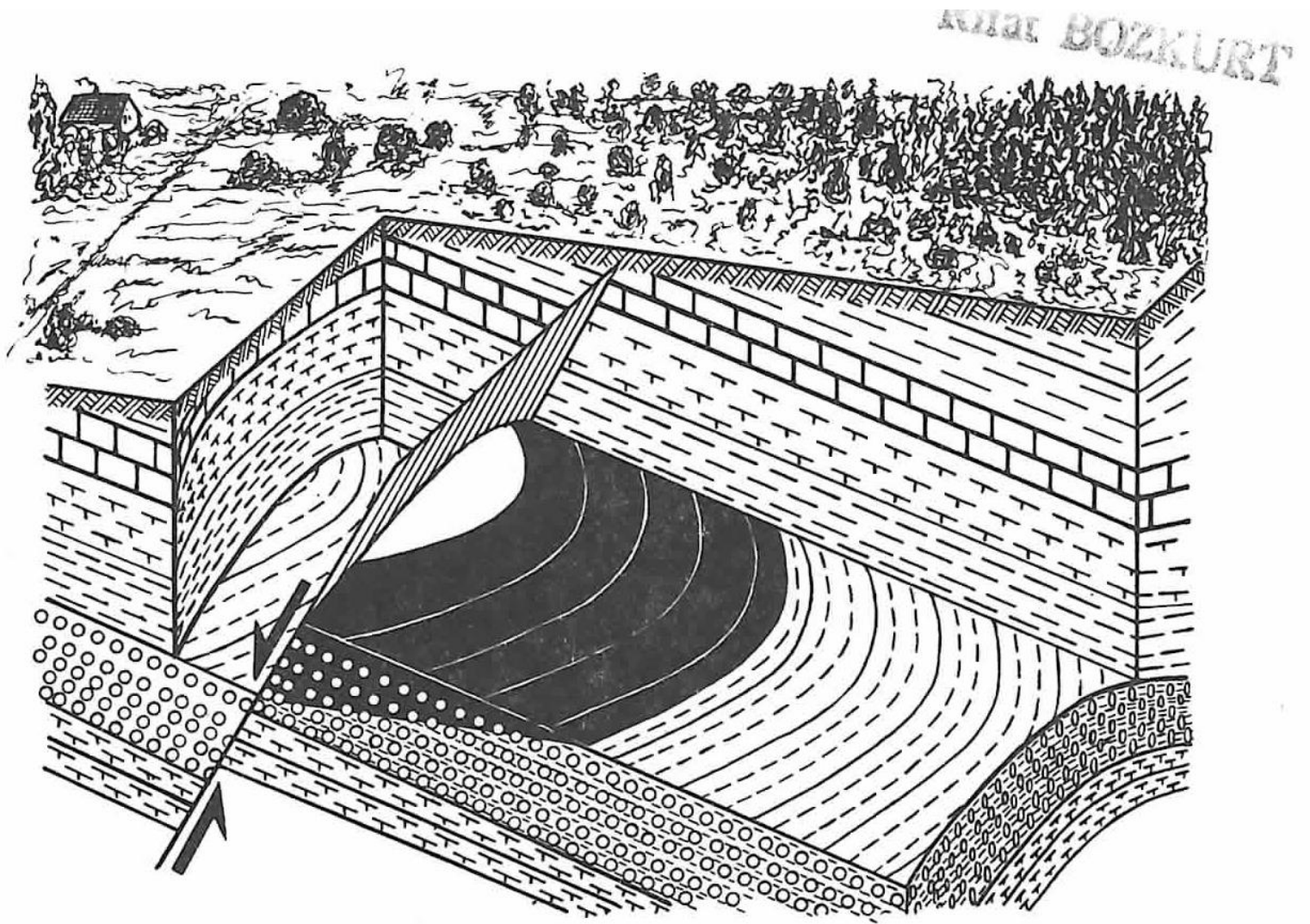


Fig. 29 Schematical cutaway view of an oil trap before a reverse fault, with a gas cap, oil, and water. The trap contains oil though the pay formation of the higher block is in direct connection with that of the lower block.

Şekil 8.6 Normal faylı kapan (tip B-1) (Beckmann, 1976)

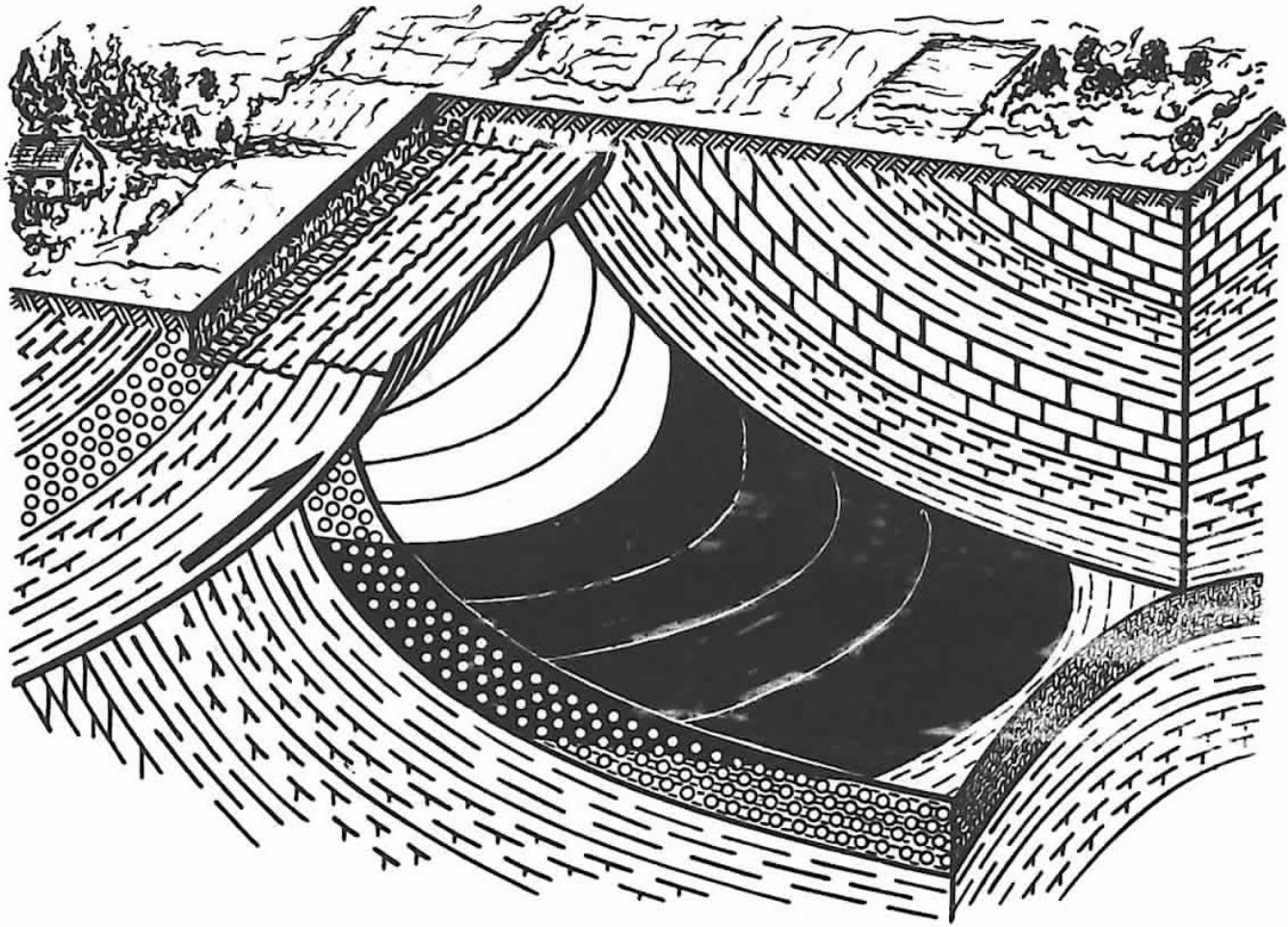


Fig. 34 Trap below an overthrust fault. The shales of the upper block seal the pay formation of the lower block.

Şekil 8.8 Ters faylı kapan (tip B-2) (Beckman, 1976)

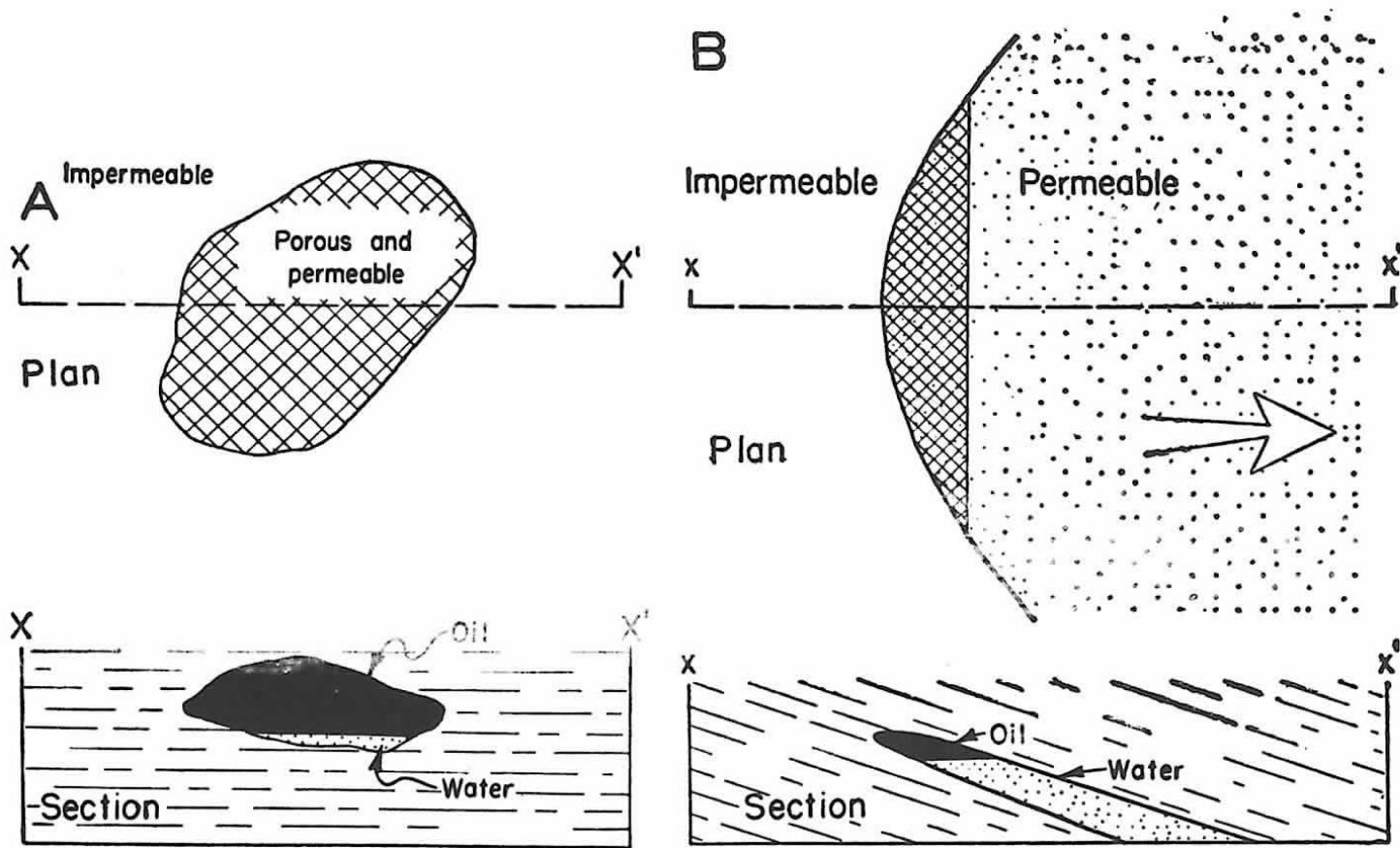


FIGURE 6-1 Sketches showing (A) typical lens-type traps completely surrounded by impermeable rocks, and (B) an irregular up-dip edge of permeability on a homoclinal regional dip. Arrow shows direction of dip.

Şekil 8.10 A = Kumtaşı merceği kapan (tip C-1.1)

B = Kamalanmış kumtaşı kapanı (tip C-1.2) (Levorsen, 1958)

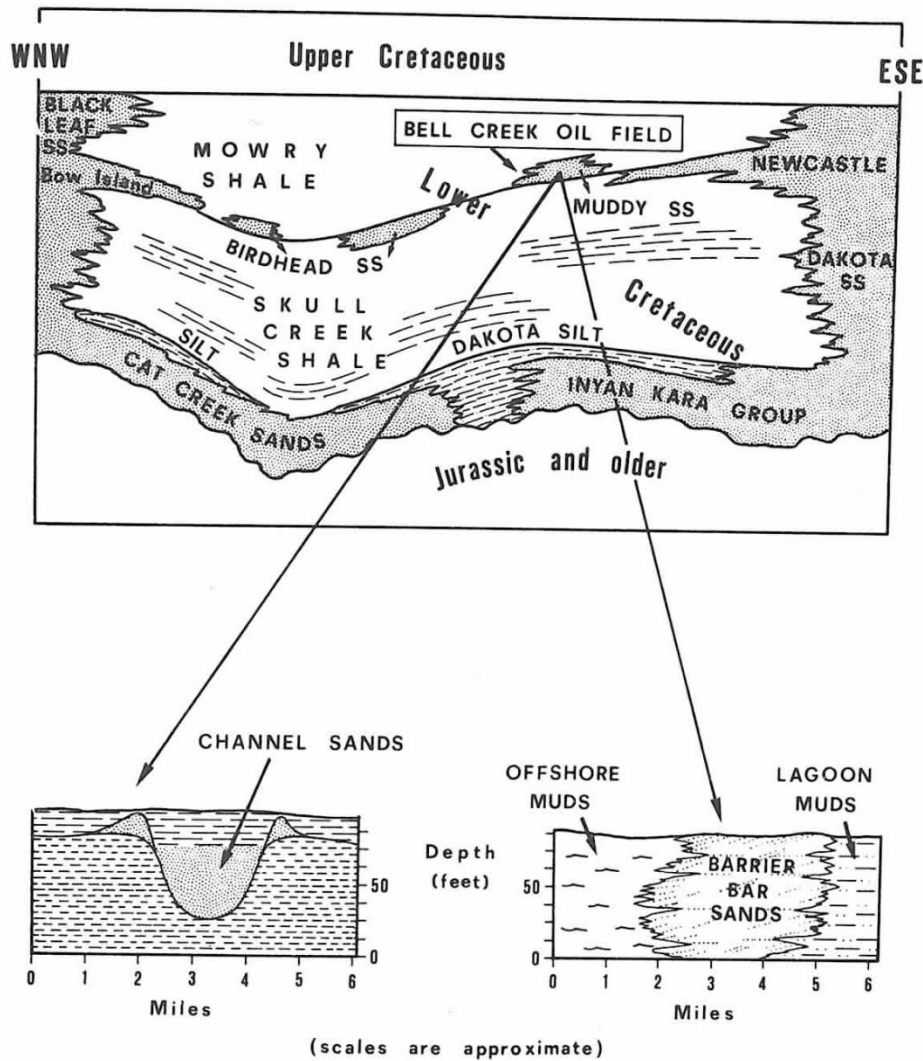


Fig. III.5.6. The Bell Creek oil field in Montana. A geological profile through the Powder River Basin, showing the oil field location and the geological setting of the channel and barrier sand which act as reservoirs. (After McGregor and Biggs, 1970)

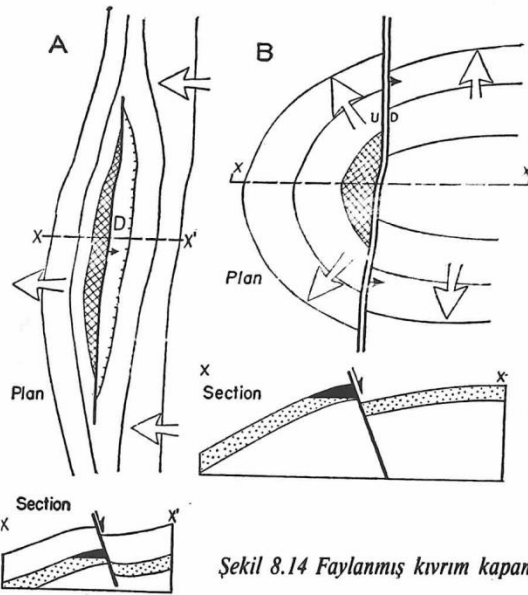


FIGURE 5-24
 A, trap formed by intersection of low fold with normal fault; B, trap formed by intersection of normal fault with more acute fold (Arrows show direction of dip.)

Şekil 8.14 Faylanmış kıvrım kapanları (tip D-1.1) (Levorsen, 1958)

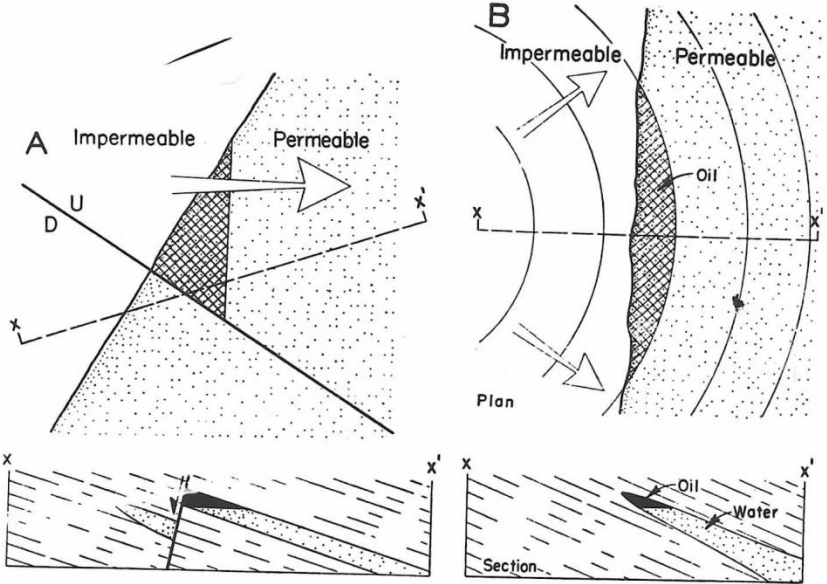


FIGURE 7-1 Diagrammatic sketches showing characteristic combination traps: A, intersection of a fault with the up-dip edge of permeability; B, arching, across an up-dip edge of permeability. Arrows show direction of dip.

Şekil 8.15 A- Faylanmış fasiyes kapanı (tip D-1.2)
 B- Kıvrımlı, fasiyes kapanı (tip D-1.3). (Levorsen, 1958)

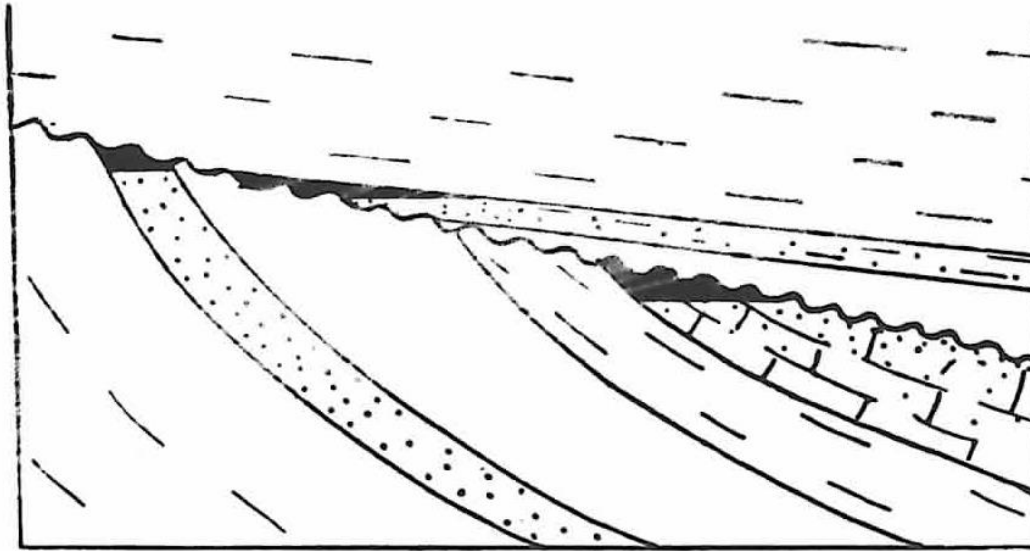


FIGURE 6-52

Diagrammatic section showing traps commonly associated with surfaces of unconformity.

Şekil 8.16 Diskordanslara bağlı kapanlar (tip D-2.1) (Levorsen, 1958)

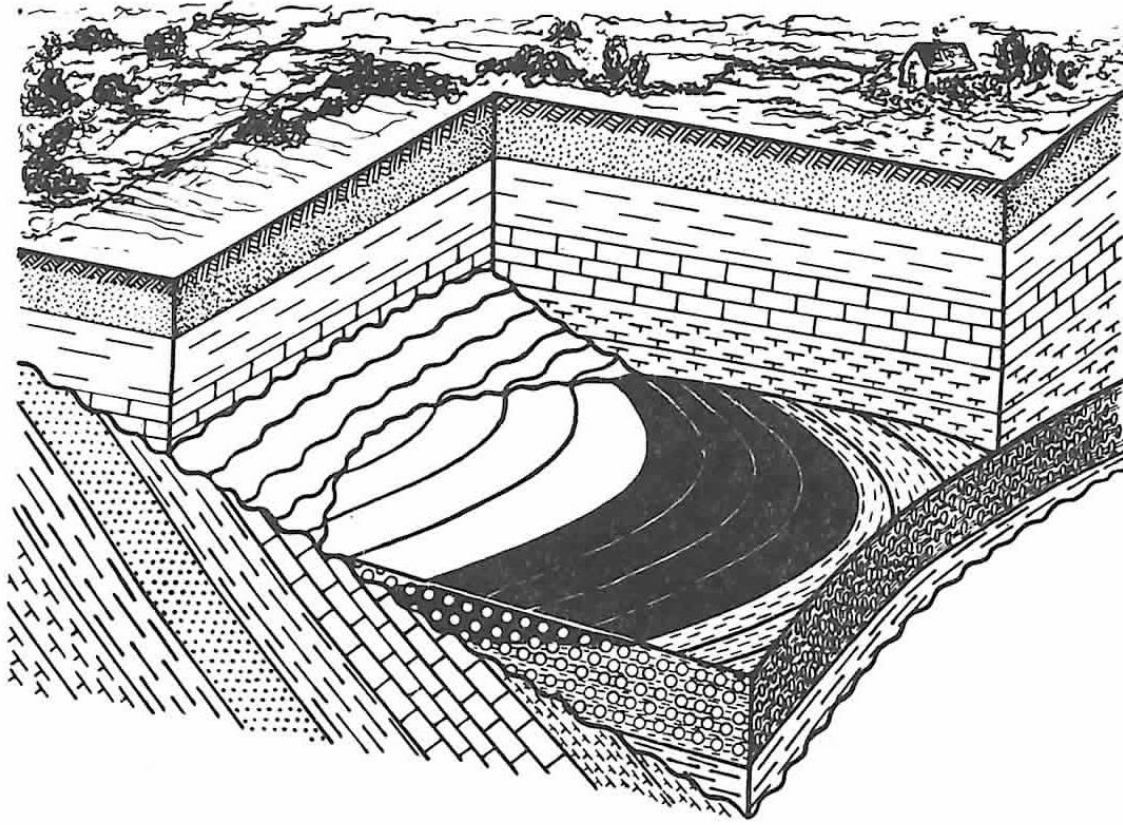


Fig. 36 Trap above a disconformity, or overlap field. Both the older block and the plane of the disconformity have been tilted. The younger sediments overlap one another. The pay formation is sealed by overlying and overlapping shales.

Şekil 8.18 Diskordans üstünde oluşmuş bir kapan (tip D-2.1) (Beckmann, 1976)

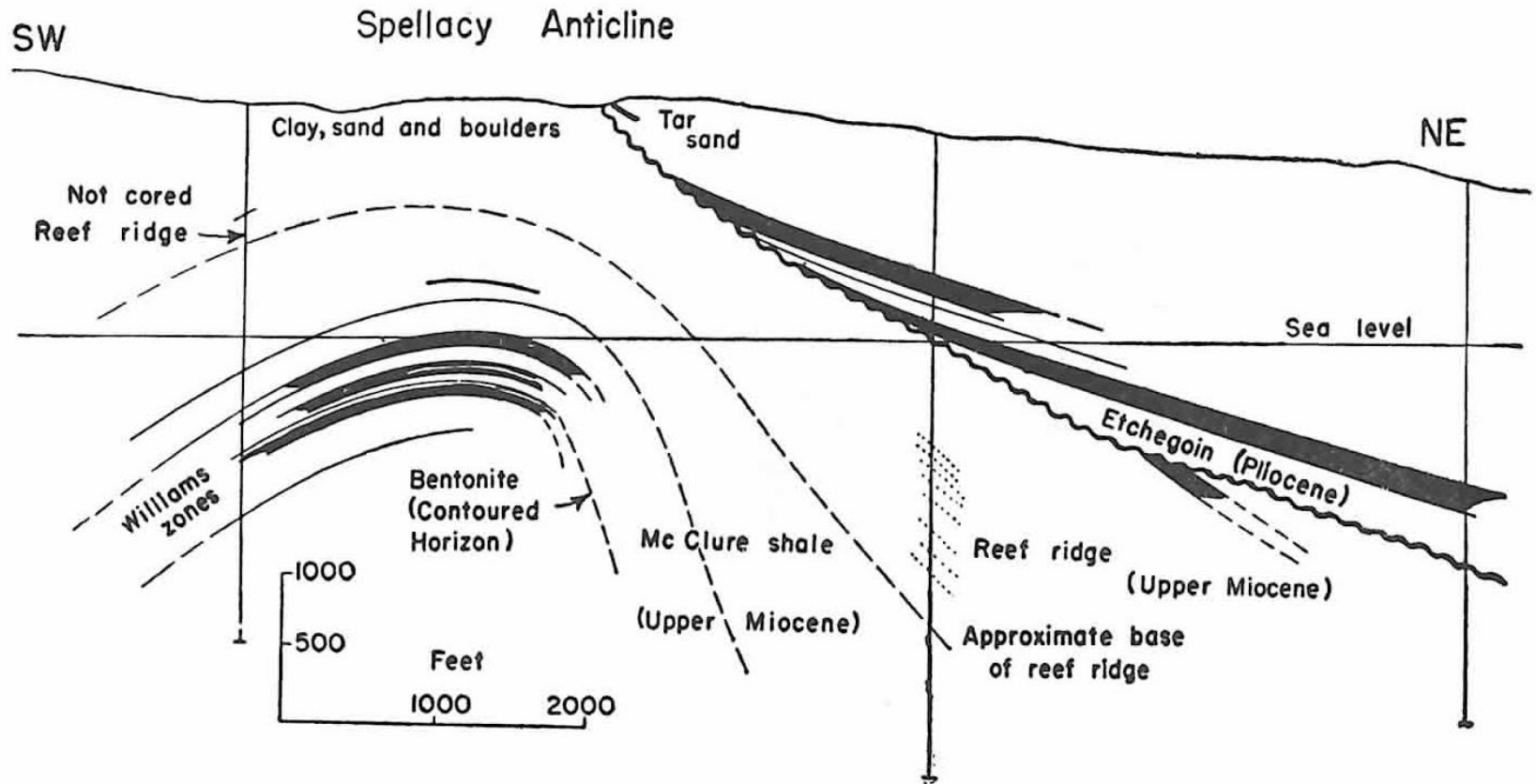


FIGURE 6-54 *Structural section across the Williams and Twenty-Five Hill area, in the Midway oil field, California, showing pools trapped above and below an unconformity plane. It also shows the multiple sand possibilities of an anticlinal trap. [Redrawn from Hillis, Bull. 118, Calif. Div. Mines, p. 526, Fig. 225.]*

Şekil 8.19 Diskordansa bağlı kapanlar (tip D-2.1) ve diskordans altında A-tipi bir kapan (Levorsen, 1958'den)

Section through salt-dome field

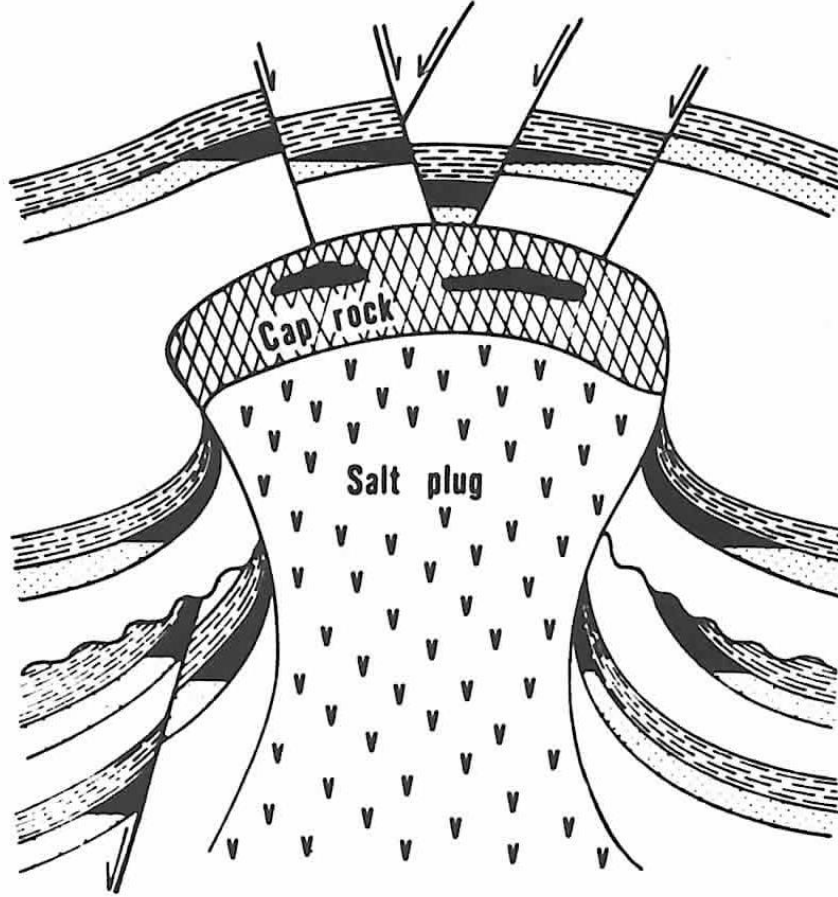


Fig. III.5.5. Some possibilities for oil pools associated with salt plugs. (Modified after Levorsen, 1967)

Şekil. 8.22 Bir tuz domuna bağlı kapanlar (tip D-2.3) (Tissot ve Welte, 1984'den)