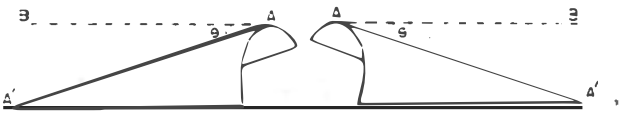
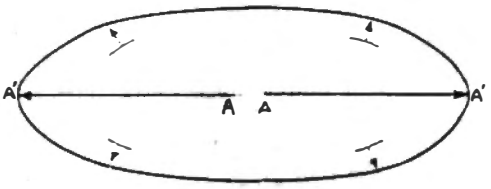
EXAMPLES OF DIFFERENT KINDS OF FAULTS FROM INDIA

So far a detailed technical account of the faults has been given. It is desired in this section to describe some faults actually encountered in the different parts of India.

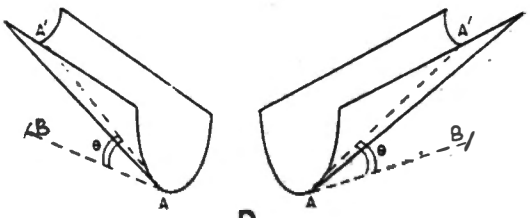
1. The Dauki fault is a dextral transcurrent fault along which the Assam Plateau has been moved to the east over a distance of 250 km. (Krishnan, 1968, p. 52).
2. Along the western margin of Vindhyan basin is a large reversed fault (the Great Boundary Fault of Rajasthan) which brings the Arvallis on the western side, against the Upper Vindhyan Bhander sandstones on the eastern side, and which has been traced over a length of 800 km. (Krishnan 1968 p. 54).
3. The chief coal fields of India owe their preservation to the block faulting (Krishnan, 1968, p. 56)
4. In the Extra Peninsular region of India, several thrust faults have been recognised. *Murree thrust* is located in Kashmir and it is an *autochthonous thrust.* In the Simla-Garhwal region, *Krol, Jutogh, Giri, and Chail thrusts* are recognised. According to Heim and Gansser (1939), there are atleast 4 superimposed thrust sheets in the Lesser Himalayas of Garhwal region. The Main Boundary Fault (MBF) separates Siwaliks from the earlier Tertiary and older rocks. There are imbricate thrusts along the Himalayan border. Mt. Everest and Kanchanganga peaks are located in the *Central Himalayan thrust.* There are thrusts in the *Tethys Himalayan zone, Flysch and exotic zone and Counter thrust of Darchen zone* (Krishnan, 1968, p. 59).
5. The edge of the continental shelf of the western coast is remarkably straight as it as a fault line formed in the Late Pliocene (Krishnan, 1968, p. 64).
6. The Cambay area lies in a trough fault running N - S in which the Deccan Traps have been dropped down to a depth of about 2000 meters (Krishnan, 1968 p. 64).
7. Major E - W trending faults have been found bounding Kathiawar on the north and south, the latter one by geophysical methods. There is also a prominent fault seen for a distance of 40 miles or more along the northern margin of Rann (Krishnan, 1968 p. 66).
8. E - W trending strike fault runs over a distance of more than 10 km. affecting the rocks of Kaladgi formations (Foote 1876). This is located to the immediate north of Saundatti town, Belgaum district, Karnataka state.
9. Three major faults have been reported by Pujar (1989), from quartzarenites exposed between Yekkeri, Hulikatti and Manikatti villages, Saundatti taluka, Belgaum district, Karnataka state. One fault is 4.5 km long and trends in a N 45°W - S 45°E direction, the second one has a length of 2.5 km. and a N 15°E S 15°W trend. The third one is the longest, it being 6 km. in length. It has a W - E trend and is further classified as a sinistral fault. The first two faults are oblique faults, while the third one is a near strike fault.
10. A N 50°W - S 50°E trending thrust fault occurs on the eastern border of the Bagewadi conglomerate, this rock constituting a member of the Gadag schist belt. This fault is about 10 to 15 km. long (Gokhale et. al., 1971).
11. A N 65°E - S 65°W trending dip rotational fault is developed in the Kaladgi formations composing the Nargund hill, Dharwad district, Karnatak state. The central part of the hill has developed a sag which can be seen even from a far off distance (Puranik et. al. 1982).
12. The Navilutirth gorge carved by the Malaprabha river is a dip fault trending nearly N - S which has been availed by the said river. The gorge is located in the northwestern vicinity of the Saundatti town, Belgaum district, Karnataka state.
13. Mekedatu (Goat's leap) which is 1.6 km. long and 40 meters deep, is cut by the Kaveri river, the rocks being Closepet granites. Trend of the gorge is nearly N - S. Notwithstanding any other reason, the gorge marks a fault plane. The gorge-cum fault is located 100 km. south of Bangalore, Karnataka state.
14. Magod waterfalls of Bedti river is a two step falls, the upper one of 20 meters, and the lower one of 180 meters. The country rocks are metagraywackes. The two step falls represents a step fault and is located about 17 km. east of Yellapur, North Kanara district, Karnataka state (Photo 22).



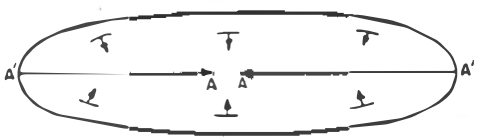
C



C_1



D



D_1

C = doubly plunging anticline. The axes AA' plunge in opposite directions. AB is the horizontal line.

C_1 = outcrop of fold shown in Fig. 92 C on a flat ground surface. Note that the axes AA' plunge in opposite directions and the outcrop closes in the direction of the plunge of the fold (point A'), unlike that shown in Fig. 92 B_1 in that case the fold is plunging only in one direction).

D = doubly plunging syncline. AA' is the axis of the fold and AB is the horizontal line. Note that the fold closes at A', but the plunge is towards A.

D_1 = outcrop of fold shown in Fig. 92 D on a flat ground surface. AA' are axes of fold. Note that the fold closes in opposite direction of plunge. Plunge is towards A, but the fold closes at A'.

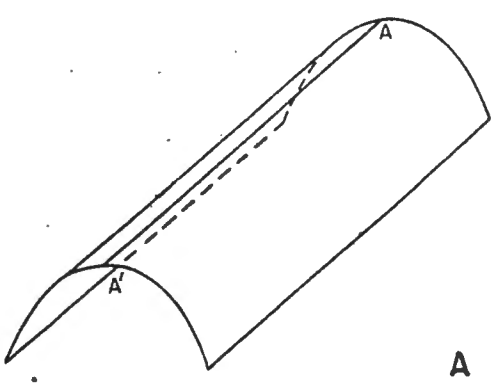
(c) **Dip direction of limbs of fold:** This basis nodoubt gives rise to two basic forms namely the anticline and the syncline. A further variety is developed when both the limbs dip in the same direction, unlike that noticed in the basic forms. The new variety is called the "isoclinal fold" - iso meaning same, and clinal meaning the direction in this particular case. The isoclinal fold is further divisible into

(i) inclined, and

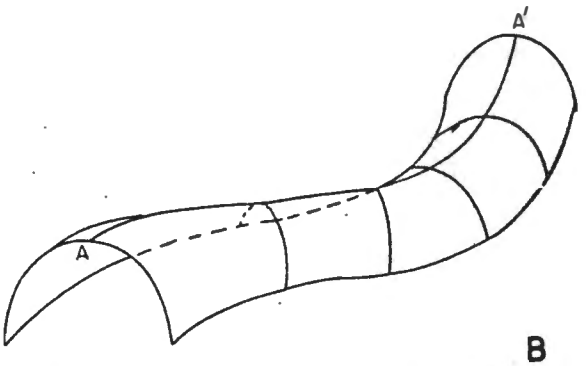
(ii) recumbent or horizontal folds.

These varieties are shown in Figs. 93 A,B,C. In Photo 52 inclined isoclinal fold has been presented.

There is another type produced when the axis of the fold is not off set, but is folded again. This is called as a "refolded fold", and it applies both to the anticlines and the synclines. Due to refolding, the fold axis gets bent, and the fold therefore does not continue in a linear fashion, but gets shifted. This is shown in Figs. 106 A,B. Excellent example of this type of fold is offered by the schistose rocks of the Gadag schist belt. The banded hematite quartzites form a part of the belt, and this rock shows a clear change in the trend direction from NNW - SSE through NW - SE, WNW - ESE, W - E, N - S, NNE - SSW, N-S and back to NNW - SSE direction, over a distance of nearly 56 km. (Maclaren, 1906). The banded hematite quartzites are bent at the places of change in the strike direction, thus resulting in the refolding of the axis of the fold. Gothe (1973) and Koppad (1975) who have studied parts of the Gadag schist belt have documented change in the trend of the axis of the fold, and these are presented in Photos 55 and 56.



A - anticlinal fold showing continuation of its axis AA' in a straight line when traced along its extent



B - anticlinal fold showing curvi-linear extension of its axis AA' when traced along its extent. This is produced due to refolding of the axis alone.

Figs. 106. A,B. Effect of refolding of axis of the fold.

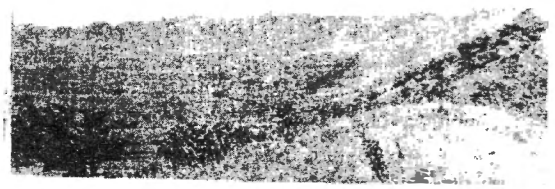


Photo 57. Field photo showing refolded limb of an isoclinal fold produced in thinnly laminated banded hematite quartzites. Palm of the person indicates horizontal axis of the refolded structure, which is parallel to the main axis of the isoclinal fold. Note that at the axis, the rocks have undergone crushing with the production of breccia. The structure is located in the NE part of the Arpee Iron Ore Mines, Hospet taluka, Bellary district, Karnataka State. Courtesy Dr. H. D. Desai.

Photo 58. Field photo of an unusual knee shaped fold developed in banded hematite quartzite through refolding of the limb of the main fold. This fold is trending N 55° W - S 55° E, the limb being vertical in attitude. Axis of the refolded fold is also vertical. Note the crushing and flowage of the rock at the bent portion (ball pen indicates the knee shaped bend in the rock). This structure is located 3 km N 50° E of Kalahalli village, Sandur taluka, Bellary district, Karnataka State. Courtesy Dr. H.D. Desai.

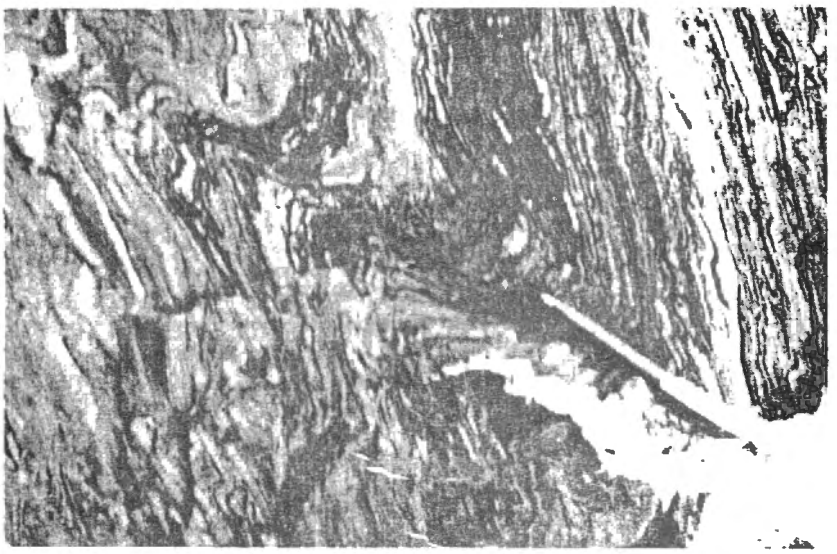


Photo 59. Field photo showing development of boudins as a result of folding accompanied by refolding. The rock is a ferruginous shale. Development of drag folds is clearly observable on the left hand side of the photo. Ball pen is along the axis of refolding. The struture is located in the Aarpee Iron Ore Mines, Hospet, Bellary district, Karnataka state. Courtesy Dr. H.D. Desai.

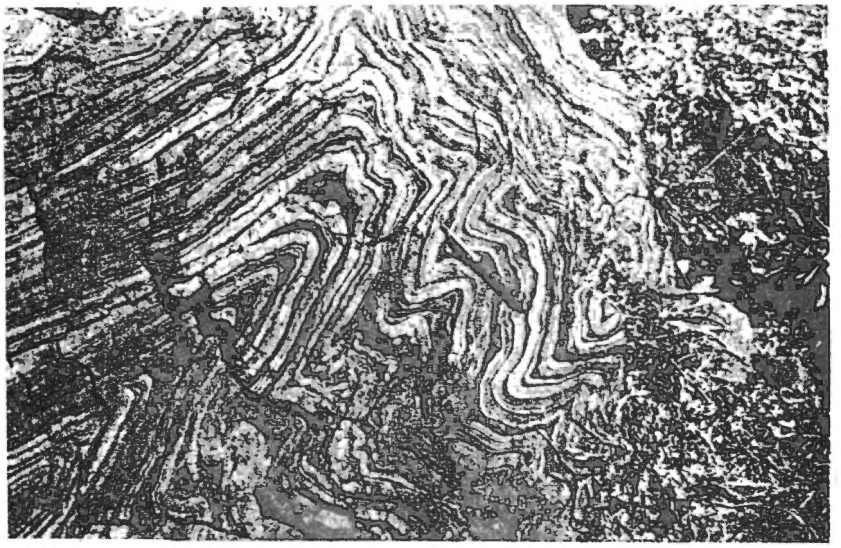


Photo 60. Field photo of a complex fold registered in banded hematite quartzite of Nagavi area, Gadag taluka, Dharwad district, Karnataka state. Note that the rocks show V shaped pattern at some portion, flow fold type at the central part, and no folding at all at some other parts. The pattern is therefore complicated one. These rocks constitute an important member of the Gadag schist belt of Dharwarian age. Courtesy Dr. S.C. Puranik.