Farnham Geological Society

(A Local Group within the Geologists' Association)

NEWSLETTER AUTUMN 1994

U23 - No 12

MEMBERS CORNER

Your **Newsletter** Editor wishes to apologise for the late arrival of this edition. It is partly due to persistent technological problems. We have to thank David Stevens for his contribution on "Kenya", Alan Comer on "Small Round Objects" and Lewis Carroll, "Notes on Committee Work". The "Fake Fly in the Natural History Museum" was exposed by Andrew Ross who was a student who attended our Brighton Field trip (May 1993). This report was from the "Times" in November 1993.

The Committee and Membership of the FGS wish to convey their deep sympathy to Pat Wilson on the death of long-time member Colin Wilson at the end of June. Colin and Pat were familiar faces on many of our field trips over the years and rarely missed a meeting. Last year they had moved to Totnes shortly after Colin retired. He will be missed by all.

David Taylor at long last has returned from his long sojourn in Houston, Texas. He was a former secretary of the society and always an active member. We look forward to David coming back into the fold.

Our best wishes to Dr Paul Olver for a speedy recovery from his recent illness. Paul had been a leading light in the forming of Farnham Geological Society.

HELP WANTED: An enthusiastic member who loves going on field trips and is good at planning and arranging transportation and venues. Never a dull moment,should be lots of fun and challenging. Contact any committee member.

SAFARI IN KENYA - FOLLOWING IN THE STEPS OF J W GREGORY IN OCTOBER 1993 by David Stevens

There are three main geological and geographical areas of Kenya. First the coastal strip which is hot, with rain off the Indian Ocean and relatively recent marine deposits, such as coral. Secondly, the central area is uplifted Precambrian crystalline rocks deeply weathered, with some metamorphics standing out from the general plain. Thirdly, the area in the west consists of the Highlands, generally 5,000' to 8000' high, with moderate temperatures and rich volcanic soils associated with the formation of the Rift Valley, which chiefly started around 25 million years ago. This movement is still in progress with considerable activity happening from time to time, the last being the 1996 eruption of Mount Lengai in Tanzania near the border with Kenya.

John Walter Gregory, born in 1864, was the son of a Scottish wool merchant, who later traded in Bermondsey. He studied at London University and worked for the Geological Department of the Natural History Museum, whence he undertook his expeditions to Kenya.

He then went on to verify the theory of a graben formation for the Rift Valley, postulated by the Austrian, Professor Eduard Suess in 1891. Gregory first saw the Rift valley NW of Nairobi from near Lamer overlooking the valley plain with the volcanic mountains of Susua and Longonot extending up from it's floor. He was supported by 40 Kikuyu people and had started from the coast at Mombasa. Up to this point they travelled chiefly in Kikuyu territory but entered Masai country in the Rift Valley. He only investigated Mount Longonot because he could not pacify the Masai, and did not stay long in the area south of Lake Naivasha.

However we were not menaced by Masai at Naivasha. One day we walked nine miles down Hell's Gate, one of only two game parks where one is allowed on foot. This wide gorge was formed when Lake Naivasha's southern bank burst resulting in flood water eroding the valley. We saw spectacular columnar jointing in 300' cliffs of basalt. At the head of the gorge we noted a volcanic plug protruding from the valley floor called Fischer's Tower. It was named after a German explorer, Gustave Fischer, who was the first European to record this feature in 1883. A second volcanic plug, with acacia trees on top, was further down the valley called Embarta at the point where a ravine commenced. This ravine had been eroded out by streams off Mount Longonot to the east.

We were guided through very narrow gorges by a Game Park Warden. The views were excellent in the sides of the ravines of the successive volcanic deposits of ash, pumice and obsidian discharged from Mount Longhand. There were also hot springs in the gorge. This thermal water is exploited about a mile away at the Olkaria Geothermal Station which produces electricity. The temperature of the water used is 304º C and comes from several thousand metres depth.

Gregory moved his investigations 100 miles north along the Rift Valley to Lake Bogoria and Lake Boringo where he worked mainly around the latter. He took samples from both sides of the valley. The west side was the most revealing, where a block called the Tugen Hills, 7000' high, had tilted heavily westward exposing crystalline rocks. He collected numerous specimens in order to deduce the geological history of the Rift Valley. Gregory was nicknames "Bulging Pockets" whilst collecting rock samples. This eastern arm of the Rift Valley is named after him.

We had a chance to see some of this area but did not collect rock specimens. However we did have good sightings of hippos, crocodiles and numerous birds including fish eagles and hammerkop. Lake Baringo is freshwater and has no visible outlet but presumed to discharge underground northwards. We had a trip on the lake to a volcanic island on which we saw some hot springs and gases escaping. We had good views of the eastern escarpment up to the Laikipia Plain. This escarpment is formed in three steps at this point. Lava flows were in much evidence as was more columnar jointing.

J W Gregory published 20 books, two of which are about East Africa (published in 1896 and 1921). He became professor at Glasgow University from 1909 to 1929. He died whilst shooting rapids on the Urubamba River in Peru in 1932 during investigations of the Peruvian Coastal belt.

References: Africa's Rift Valley by Colin Willock, published by Time-Life in 1974.

The Great Rift by Anthony Smith, published by BBC Books in 1988.

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REPORT ON QUESTIONNAIRE OF SEPTEMBER 1993 ON ANNUAL DINNER AND FIELD TRIPS

40 Members answered it. Duration of membership was from one plus to 21 years. Only one member wrote extra comments on the back of the form.

Wording was ambiguous. "Cross out what does not apply" would have been useful. A combination of circles, ticks and cross-outs led to untidy forms.

Membership		Attended Field Trips	Attended Dinner
10+ years	19	19	19
less than 10	21	13	8
TOTAL	40	32	27

Field Trips: 10 favourable comments but notable ones were;

Not enough long field trips.

Enjoyed the smaller field trips, i.e. 15-20 people rather than large groups in a coach.

I believe cost can be crucial to younger element in Society. Also the avoidance of school holidays can make life difficult for some.

Field Centre preferred. Three to four days or extended Bank Holidays.

All very interesting but partially determined by cost - would not go on an overseas trip.

Only quibble is the apparent necessity for pub lunches which take time and often divert group.

Dinner: six positive comments but also some others;

* do not like set menus
* not always supplied by what was ordered
* say speakers not necessary to make it an enjoyable occasion
* for good ADS. A quiz for a prize was mentioned but expensive.
* preferred occasions where we can socialize more, i.e. X-mas meeting. Dinner very limited once at table, also expensive.
* thought Alton venue best
* liked the name cards on tables as recently done. Bush Hotel best value with good food and good speaker. Jolly Farmer (Puttenham) best food.
* had mixed feelings. Value for money generally poor. Opportunity to mix dependent on seating arrangements. Several small tables preferred.

Serving on the Committee: Apart from the three members of 14 years standing who are or were on the committee the following replies are noteworthy;

21 YES
18 YES but I have 18 jobs!
15 not at this moment
14 not in the immediate future
12 maybe
10 Have no geological qualifications to serve on committee
8 no spare time
Otherwise a resounding NO

Other suggestions were;

18 say they are deaf and would love handouts to read. Would like all members to wear name badges.
17 would like to go to the Gower some time or Arran Isle (Scotland) also Connemara.

14 for members to wear name badges at meetings as it is hard to get to know new names.
14 think it is very important to integrate new members. Criticism has been received.
10 mention that perhaps a little research project (local) would be a good idea-similar to Neptunian dyke project undertaken a few years ago.
7 are for notifying all members about trips in writing before starting a list. Encourage comments, suggestions, etc. at AGM.
3 would like more one day field trips especially relatively local.

$$$

ON FORMING A COMMITTEE IN WONDERLAND

The procedure is, the Red Queen said,
Of consummate ease!
I tell the Chair to choose its own,
The Society to please.

(The Chair selects - the Floor elects!)

The choice is made well in advance,
By personal approach!
The Chair leads all a merry dance,
Then invites the Floor to vote.

(The Chair proposes - the Floor disposes!)

The Floor now exercises
Its individual power.
It may elect the wholesome lot
Or reject the total shower.

(The Floor decides - the Chair abides!)

So that's how it's done in Wonderland.
Alice, to herself, remarked,
Let the Floor agree and I'll have time
To go hunting for the Snark.

(The Rules allow it - does the Floor agree it?)

submitted by Charles Lutwidge Dodgson Esq.

SMALL ROUND OBJECTS by A T F Comer

Members who went on the Geological excursion to the Auvergne, led by Dr Reg Bradshaw, will remember an exposure in the volcanic rocks of the Allier valley, consisting of a bed of rounded pebbles or remarkably constant size between that of a golfball and a tennis ball, sandwiched between two lava flows. We stood and looked at it for a long time because it seemed so incongruous. Pebbles should be waterworn, found in an old stream bed, but how could there be a stream long enough and with sufficient energy to produce so many pebbles on the side of a fairly small volcanic cone? Why should the pebbles be so consistent over an exposure length of nearly 20 metres? Although the bed of pebbles sloped downward towards the left, there was no hint of slumping, as might be expected - the pebbles were perched on the top surface of a lava flow which seemed to be undisturbed, and were covered by another that appeared to be of exactly the same type, giving the exposure a very even thickness along its full length.

There were as many opinions as there were members in the party, some quite subtle, but we finally left without reaching any satisfying conclusions about the cause of what we had seen.

This year a small party which included several members of the Auvergne expedition including Dr Bradshaw, went to have a look at the volcanics in the small Greek island of Santorini. One of our days was spent in the vicinity of the buried Minoan city near the village of Akrotiri, where we could see the pink and the white pumice of the classical eruption, lying with related ignimbrites, all piled against and partly mantling some much older, bright red cliffs of lava that must have been as prominent in the Minoan scenery as they are now. The material is dense, and is obviously iron-rich, a fact clearly known many hundreds or perhaps thousands of years ago, because until lately there were some kilns dug into the ground not far from the nearby beach in which this lava was smelted for its iron, although by whom is not quite clear. Unfortunately no effort was made to preserve them, and they have been allowed to erode away, so that perhaps the photographs taken by earlier parties of geologists are the only remaining records of an important and unexpected early local industry.

The red cliffs are nearly at right angles to the present coast, and probably define one side of the inlet or bay that was Akrotiri harbour in Minoan times, now filled with pumice. There is a steepish path round the end of the cliffs, and just around the corner there is a magnificent view of an old volcanic vent, its small cone sectioned almost to its centre by recent erosion to show the successive lava flows that built it up, and the material that was "frozen" in its core when activity ceased. This was too good to pass by, so we continued our walk to the top, a distance of only a few hundred metres up a fairly good path.

To the astonishment of all of us, but particularly those who had been together in France, we found not very far from the top of the final slope, a bed of rounded pebbles sandwiched between two lava flows, strikingly similar to that in the Auvergne. It was not identical. In France the volcanic cone had clearly been very much larger than that in Santorini,with several hundreds of metres of lava now above the exposure compared with only ten or so in the island. In Santorini the pebbles were not quite so well rounded nor so evenly graded. However, the similarities were far more striking than the differences. In both cases the type of vulcanism appears to be the same, the difference being only in scale, and the lavas involved look much the same, suggesting that the process that formed the pebbles was also the same in each case. But the Santorini exposure satisfied us on one crucial point, that they could not have been formed by running water, as there can never have been sufficient catchment area on such a small cone, nor sufficient elevation to provide enough energy for the task. Regrettably, this conclusion ended our inspiration - we left the site with no better ideas of the process than we had in the Auvergne.

Now, after a lot of thought since we returned, I have a suggestion to make. Imagine a little volcanic cone soon after the eruption of a quantity of lava that was not as fluid as the basalts of Hawaii or similar volcanoes nor as viscous as the black, blocky lava of Etna, but something intermediate between the two that would leave a fairly even layer with not too rough a surface. Then some time later it was mantled by an even layer of airfall material, perhaps from the same cone, but possibly from one more distant, which in due course lithify into a fairly weak rock, characteristically stronger in compression than in tension or shear. The process would continue with another layer of lava, and another, and another, building up the cone to its present dimensions, or more if there has been erosion since it all took place, and the event we have been following would become a small forgotten episode in geological history.

Except on this occasion something slightly different occurred that is more easily explained in a series of diagrams. *Fig 1* represents the cone, to show the part under discussion and *Fig 2* a section showing the airfall band.

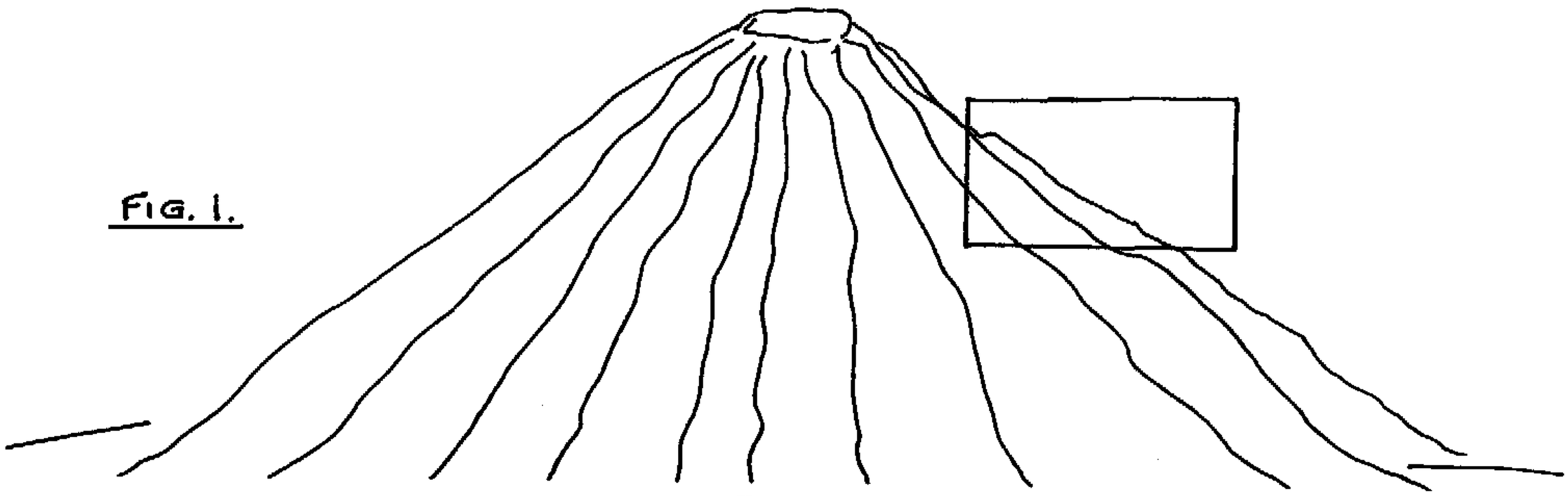

FIG. 1.

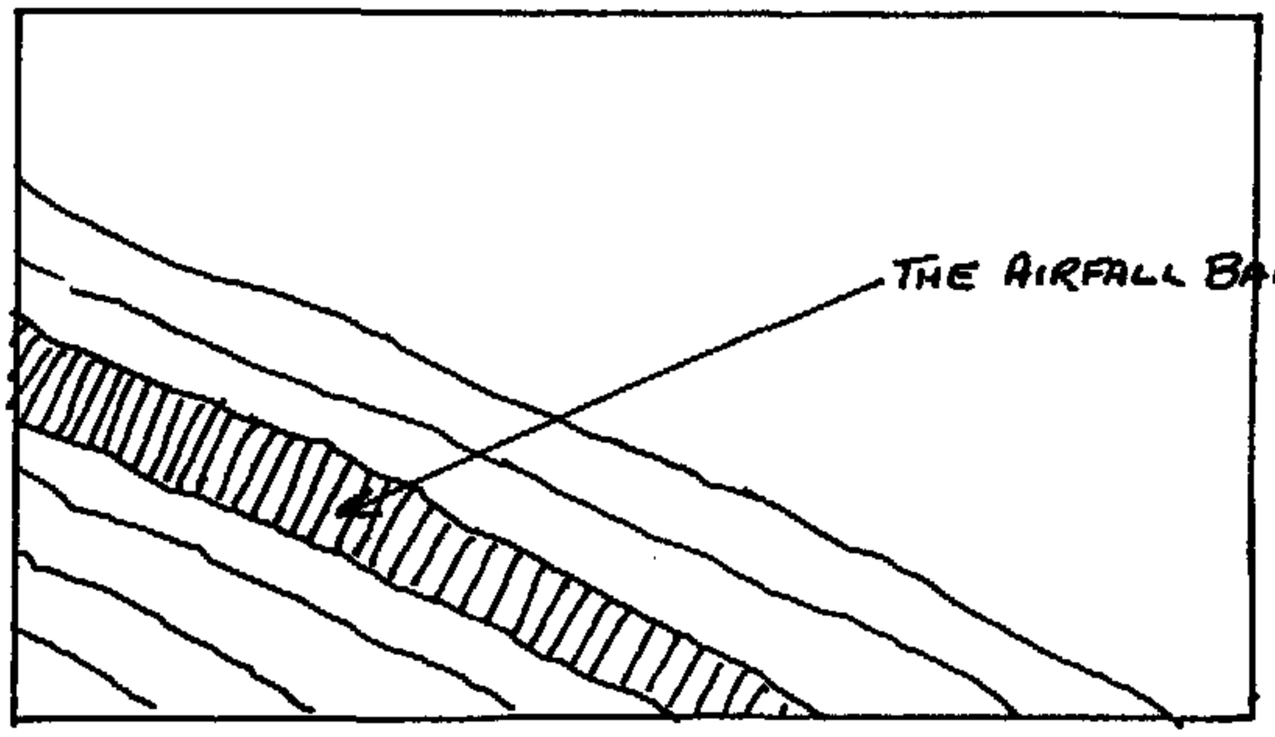

FIG 2

When the airfall material was covered by several lava flows, the weight it was carrying in compression became appreciable. Weight, of course, acts vertically downwards, but in this case the surfaces of the various layers are not horizontal, so that the vertical force can be resolved in two directions as in *Fig 3*.

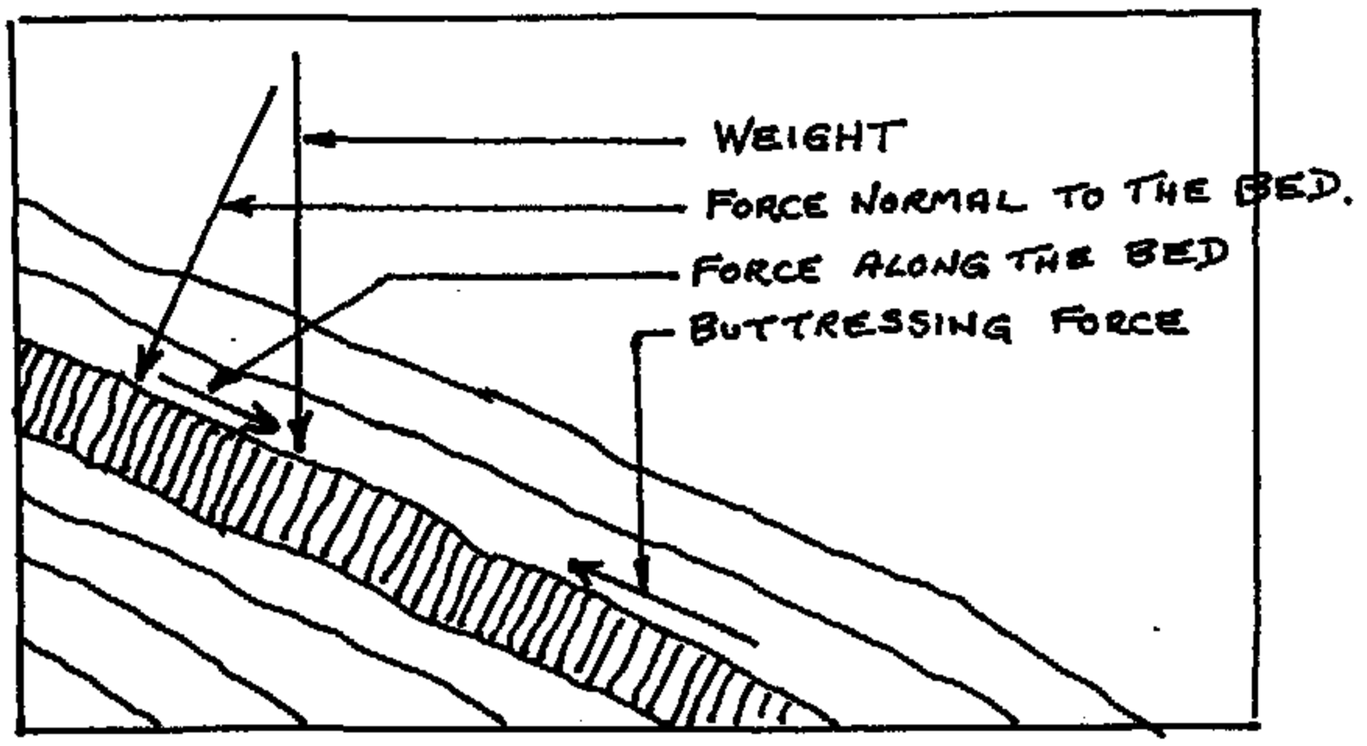

FIG. 3

The downslope component is normally absorbed by the buttressing effect of the material lower down, so that the hillside remains stable, but suppose there is an earthquake, or more realistically, that heavy rain creates a deep gully, with perhaps water penetrating through the porous volcanic material into the old airfall layer to lubricate the process. The downslope component is no longer held in balance, leaving our rock stressed as in *Fig 4* by forces at the top and bottom of the layer, which are equivalent to rotary forces if the rock should fracture. Note also that any line across the bed becomes longer as soon as any creepage takes place, so that the material could be expected to fail in tension, the weakest property of the rock. Once cracked, possibly helped by minor local earthquakes that often occur near live volcanoes, all the bits would tend to rotate and become rounded. Thus the process could give rise to anything from a bed with vertical cracks across it to a bed of reconsolidated dust that in time would not look very different from the original material, depending on how long the process continued. Intermediate between these limits, however, there would be a phase when the material was reduced to a collection of little round objects resembling balls or rollers, and those of us who visited the Auvergne and Santorini have seen two such rare examples.

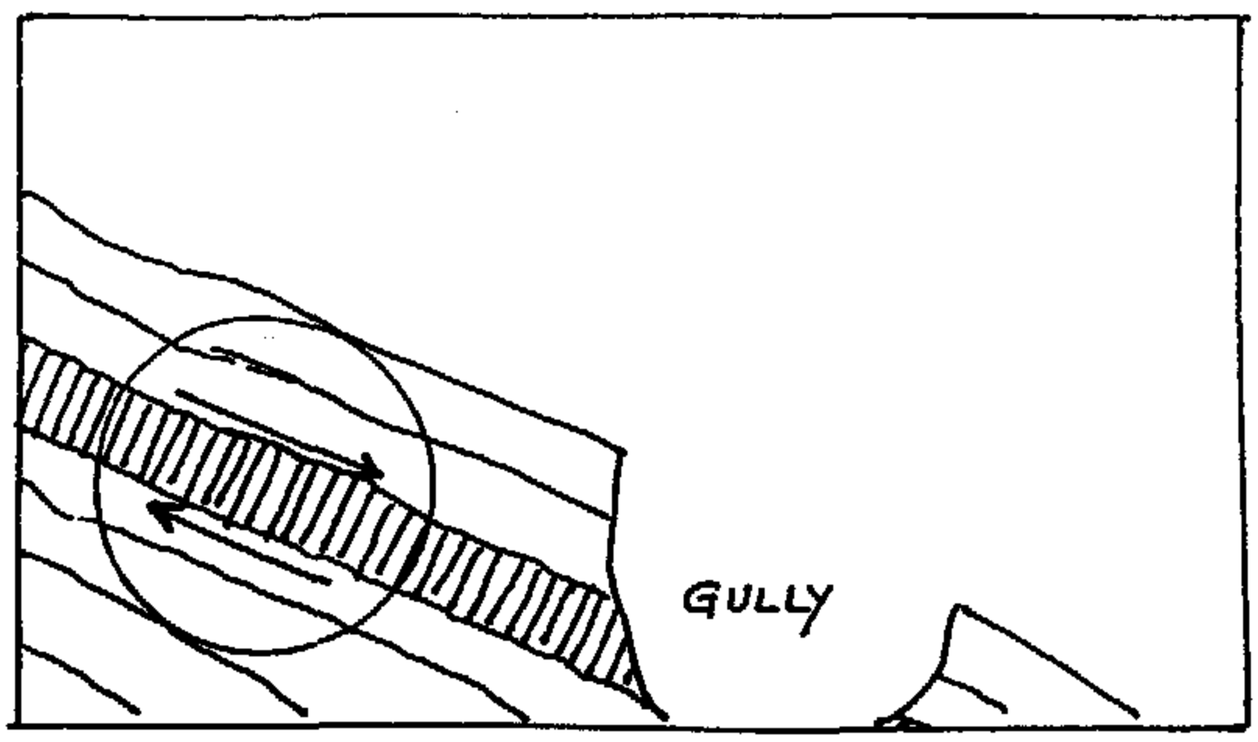

FIG. 4

N.B. Although I personally believe in this explanation, I have learned over the years not to expect unanimous support for any of my ramblings. However, if you disagree I would appreciate it if you would tell me why, or better still put your ideas on paper for this journal, so that we can all share the benefits of open discussion. A C

NEWS ITEM - MUSEUM'S PRIZE FLY EXPOSED AS FAKE

The following article was in November 4, 1993, edition of the "Times", by Nigel Hawkes, Science Editor.

THE discovery that one of the Natural History Museum's prize specimens is a fake means that the history of the fly will have to be rewritten. Scientists had for years believed that the specimen fly, preserved in amber, was 38 million years old; but it is Victorian.

The fly has been discovered to be the work of a 19th century faker, one of many catering for the lucrative Victorian market in fossils and other specimens.

It is *Fannia scalaris*, the latrine fly, which is related closely to the modern housefly, according to Dr Richard Fortey, the museum's expert in fossil flies. "The next oldest fly of this type -- and now the oldest -- is only about a million years old," he said.

The fake was exposed by a doctoral student, **Andrew Ross**, who has been examining the museum's amber collection. He noticed a line running through the piece and found that a piece of Baltic amber had been cut in half, a depression cut in one half, and the pieces reassembled with the fly between.

The museum bought the fly among 300 specimens in 1922, from a German fly expert, H F Loew. It was studied in the 1960s by the entomologist Willi Hennig, who pointed out that it was unchanged by the passing of 38 million years. "People were puzzled by that," Dr Fortey said. "Species just don't have that kind of longevity".

Andrew Ross was a student assisting Dr Rory Mortimore on our Brighton field trip September 1992.

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