

## The Visible Effects of the Flood of July 10th 1968 in and around G. B. Cave, Charterhouse-on-Mendip, Somerset

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*Summary.* The very heavy rain on July 10th, 1968, produced a temporary lake at the swallet and adjacent area of G. B. Cave. Considerable damage was caused, and while much material was washed through the cave large amounts were also brought in. Major changes in the cave took place.

### INTRODUCTION

There had been considerable rain on July 9th and one short severe storm on July 10th. In the late afternoon an intense thunderstorm developed with very heavy rainfall and this continued for several hours ending about midnight. The isohyet map shows many interesting features of this rainfall with the heaviest precipitation being very local. One of the worst areas was Charterhouse-on-Mendip which received close on 7 in. but as the important measuring site was a little way from Charterhouse the real total may have been over 7 in.

The ground was already saturated. Consequently all of the rain of the heavy downpour ran off over the surface. No records within living memory are known of such a heavy downpour as this on Mendip. It is reasonable to infer that this particular episode was one that would only be likely to occur at long intervals, perhaps of several centuries. However, rainfall of this intensity is by no means unknown in Britain and there are several known examples within the last two decades, though there is no record of such intense rainfall having occurred in a Carboniferous Limestone region in Britain so the effect of the July floods on the Mendip caves is of particular interest to spelæologists and others.

This note deals specifically with the visible effects of the floods around G. B. Cave and within it.

### THE FLOOD

An eyewitness in the area has reported that at 2130 hrs. on Wednesday, July 10th, 1968, after about three hours of rain the surface water began to flow through the environs of Manor Farm, Charterhouse, chiefly around and through the east end of the farmhouse, and on down the valley to Velvet Bottom. By 2330 hrs. the water had formed a river nearly 18 m. wide and 2·6 m. deep. The catchment area for the normally small

stream at Manor Farm swallet, is smaller than that for the G. B. stream. Thus the volume of water at G. B. Cave must have been tremendous.

At the swallet of G. B. Cave (Tynings Farm Swallet), the swirling waters had completely submerged the swallet up to and over the top of the cliff at the swallet and had submerged part of the "gruffy" ground. The lake formed extended to the cave entrance and the top level reached was above the top of the blockhouse. The thick steel outer door on the blockhouse was buckled inwards but the inner door stood the strain though not the calcite vein above it.

Between the entrance and the swallet a large collapse occurred, the walls of which were entirely in silts and gravels. On the plateau of the flat floor of the swallet much water got away and washed out a lot of the finer material down into the cave. No major collapse has yet appeared here. To the south of the swallet no collapse occurred though much water must have gone down into the cave through the deep hollow south of the swallet cliff (III on *Pl. 12*). Recently (December), a major collapse has occurred here and will get larger. There are no large stones exposed but only silts and gravels to a depth of 6 m.

The survey shows that the collapse near the entrance is related to the Mud Passage series though some way from it.

#### CHANGES WITHIN THE CAVE

The tight section immediately inside the inner door has been considerably enlarged and the whole entrance passage to a point just beyond the First Grotto has been scoured out, gravel and boulders being removed and even stalagmite encrustations. Some water must originally have gone out via the route to Mud Passage but the main quantity went on down the Ooze and into the Gorge that way. The floor of the First Grotto collapsed leaving the ladder to the roof grotto hanging with its end over a metre above the new floor level. The connecting passage to the Mud Passage eventually became blocked with mud but has been partly reopened by digging. The drop into Mud Passage is now an overhanging one of 3 m. The Ooze passage is blocked at one point by a boulder.

The Mud Passage itself has been scoured out and the crawl has gone. In the Wet Way there is little evidence of scouring though undoubtedly it must have taken a very considerable volume of water. In the Gorge the first main effect seen is the enormous mass of mud and boulders reaching from wall to wall and in places over 1 m. deep. In the Gorge the effects of the flood are spectacular. The upstream end is floored from wall to wall with a thick thixotropic mud flow. Its main point of entry seems to be through an opening in the roof of considerable size. This mud, on the evidence obtained in December after another large influx, is

probably from the general area of the Gruffy Ground by the swallet and more particularly from the collapse area south of the swallet. This mud flow is still growing and moving slowly down the cave carrying with it boulders of varying size.

The normal stream is removing some of the mud and that away from the stream bed is beginning to dry out. A raised  $\text{CO}_2$  concentration in the air has been alleged but not yet proven.

Downstream towards the Bridge large sections of the old fills have been removed but, rather surprisingly, the Bridge itself is still intact. Beneath it, however, a large quantity of material has been scoured out and it is no longer necessary to stoop when going underneath it. All the way down from the Bridge to the head of The Pitch an enormous quantity of ancient fill has been scoured out from the walls of the Gorge undermining parts of The Gallery and causing some sections to collapse. On the floor of the passage short pitches have appeared where none had existed and conversely several such pitches have disappeared.

At the bottom of The Pitch a very considerable quantity of boulders has been removed and the drop is now 15 m. instead of 12 m. Just above The Pitch the normal bypass route for the stream has been partially blocked so that most of the water under high conditions now goes straight down The Pitch.

The floor of The Gorge below The Pitch is now generally higher than previously and this is particularly noticeable at the drop down from the Oxbow. This climb has been reduced from 6 m. to 3.5 m., and at the ladder leading to the Ladder Dig the bottom 2 m. are buried in freshly deposited fill. At the end of The Gorge the Bottom Dig is now only passable for about 10 m. at which point there is a sump almost certainly choked with boulders.

The whole of the volume of The Gorge below The Pitch, because of the limited exits, must have been completely filled with water and there is plenty of evidence that water flowed out along the Ladder Dig. There is straw in the roof just above the ladder. There is a deposit of mud and gravel over 10 cm. thick in places along the crawl leading to Helictite Chamber but there is no evidence of flood water having reached further than the area of jammed boulders at the breakthrough point into the Ladder Dig Series. Beyond this point, however, there has been considerable movement of the large boulders in the first part of the Boulder Chamber. Several boulders are still in imminent danger of falling. This collapse area is almost directly over the Bottom Dig at the lower end of The Gorge. It would seem that the flood waters have undermined the boulder pile from below by the removal of the smaller debris. The rest of the Boulder Chamber and Bat Passage do not seem to have been

affected by the flood in any way and there has been, as yet, no noticeable settlement of the boulder floor in Great Chamber. Nor has there been any significant alteration in the other passages in the cave including places like the Loop, White Way and Rhumba Alley. These passages were certainly above the level of the flood and besides are not fed by active swallets. On the other hand flood debris indicates that at one time during the flood the water level almost reached the level of the Gallery in The Gorge.

### CONCLUSIONS

This article has only attempted to give a bare factual account of the flood and its effects on the surroundings of and within G. B. Cave. A more detailed geomorphological account is in preparation by another author. A fuller study is justified because of the exceptional intensity of this flood and the very considerable effects that it has produced. It is possible that by such a study some light may be thrown on some of the aspects of the development of the cave. Certainly this flood raises doubts about the conclusions that may be drawn from the distribution of fill within caves.

## A revised Survey of G. B. Cave, Charterhouse-on-Mendip, Somerset

This cave was discovered by members of this society on Nov. 19th, 1939, and account with a survey was published in 1944 (Goddard *et al*). A new survey was made and published with some more descriptive material in 1951 (Crickmay and Bendall). Various new discoveries were made and published in 1963 (Gilbert) and 1966 (Norton), the latter account included a survey of the Ladder Dig Series.

The 1951 survey is in short supply and is out of date and so, as part of this jubilee issue of *Proceedings* a revised survey incorporating the various discoveries made since 1951 is published. The survey has been drawn by D. Savage and is indexed under his name. The survey has been reduced photographically for publication.

EDITOR.

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