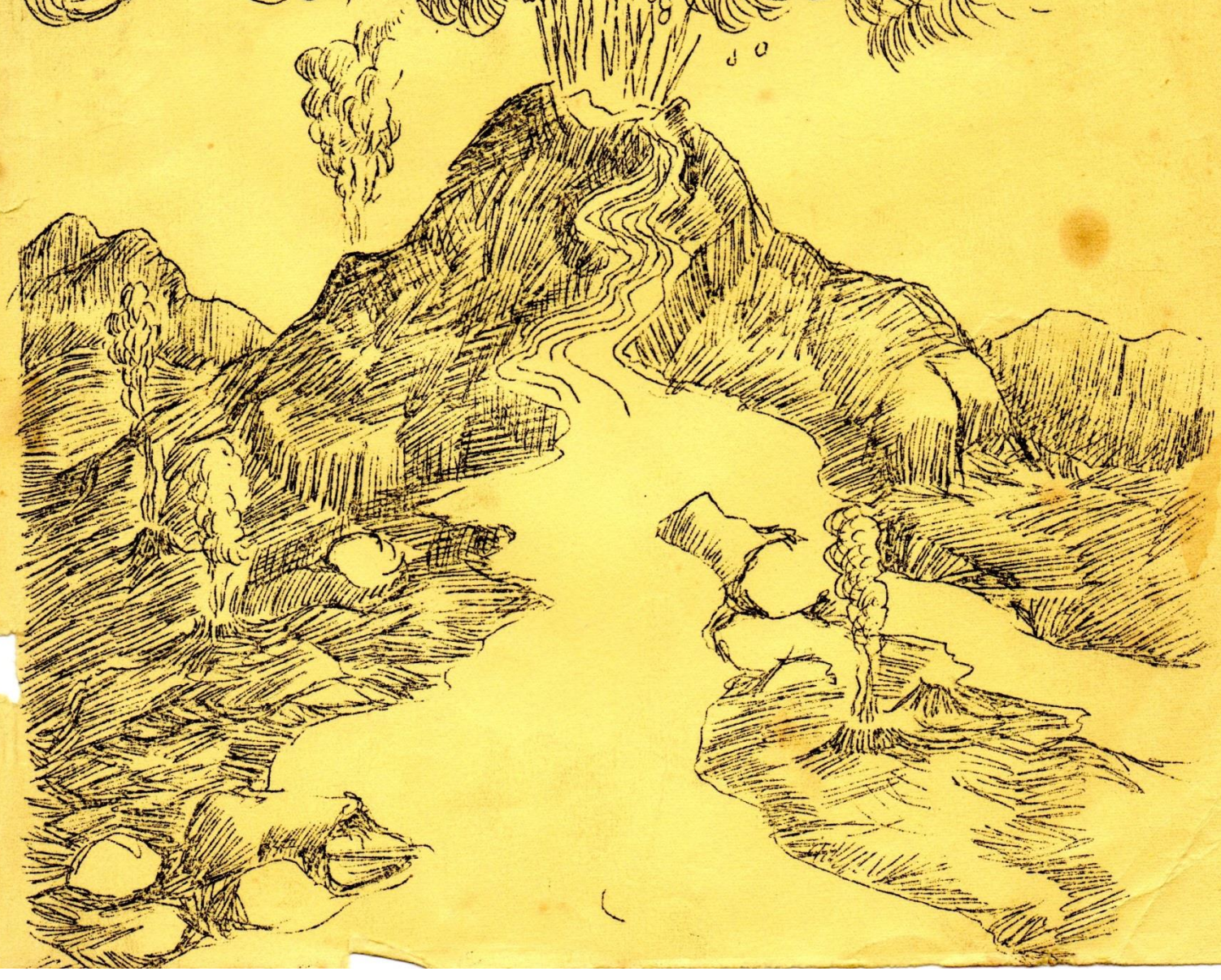
William School

EXPEDITION VOLCANO



EXPEDITION TEAM

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EXPEDITION VOLCANO

Acknowledgments

All reports are collaborations, and none more so than a report on volcanoes. This report for instance could not have been written without parents whose confidence and support was unbounded. Nor would it have come to pass without the camping weekends and the happy evenings spent together.

I am indebted to Ian Robinson and Colin Beard for the material in the preparation of the Stromboli report; to Dennis Kemp of Kodak's lecture service for his help and advice.

My sincere thanks to all the boys in the team who each played his part in producing an excellent harmony throughout the expedition and achieving the best possible results.

DENNIS CANNON,
Expedition Leader.

The Beginning

In the summer of 1967 a group of 5th/6th form boys from the Willian School felt the urge to travel. Their request was for an adventure holiday in the form of an expedition, and to take place the following Easter. Suggestions varied from a fishing trip in the Hebrides, crossing the Sahara in a mini-bus to walking in Lapland. A number of staff studied the cost and educational value before finally deciding to make for Mount Vesuvius in Italy and the volcanic island of Stromboli in the Lipari islands in search of volcanoes.

The idea of a volcanic expedition pleased me more and more but I began to feel some uneasiness when I thought how little knowledge I had on the subject. Realising my ignorance, I spent many hours searching through Library books in an effort to find a handbook on vulcanology. But in vain, the Library seemed equally determined to ignore the subject.

There was nothing definite in my mind but a desire to get there, and good will and curiosity ready for anything.

D.J. Cannon.

Preparations

Our expedition, like all others, was divided into three parts: the initial organization, which is a team effort and for which we needed eight months, the actual expedition, and finally publishing the results of our investigations.

We were faced with two main points of preparation. The first was to recruit 'suitable' characters, introduce them into the expeditionist's way of life and give them practical experience in working together as a group. For this we drew up a training programme which began with a weekend at Ivinghoe Youth Hostel where we saw slides of an expedition to Iceland, and discussed more exhaustively further aspects of our expedition.

This was followed by a four day camping expedition to the Snowdonia National Park. The high mountain camp, amidst the snow and ice, was an adventure in itself, but we learned much concerning camping techniques, clothing and survival at high altitudes which was to stand us in good stead for our expedition. It soon became obvious that many of us had no previous camping experience as we rose leisurely at nine and took two hours to cook our meals. But experience made us more efficient and we regulated our day to use all the available daylight by rising and going to bed with the sun.

All the party had simple type cameras but we felt that they should arrive on the volcanoes knowing exactly what to photograph, and how to assess a good picture. To achieve this we persuaded a professional photographer, Mr. Dennis Kemp, of the Kodak lecture service, to give us an illustrated talk on photography.

The second main preparation was to establish the aims of the expedition. These were to prepare material for a film-strip on volcanoes, and relate this to sociology and agriculture, and also to make a geographical survey of the volcanic island of Stromboli.

Initially the expedition group was notoriously unstable with people falling out as the course of preparation made them feel that they were not suited, or due to examination difficulties. This was to be expected, but when we finally decided to travel by train and mini-bus we had gathered 13 definites and got a party rate. This reduced the rail fare to £15 each. We took seven tents and intended to cook from a central tent as we had found this arrangement the most convenient. At the end of the expedition we were pleased to find that our total expenditure, including meals, rail journey and ferry to the Lipari islands, amounted to only £25 a person.

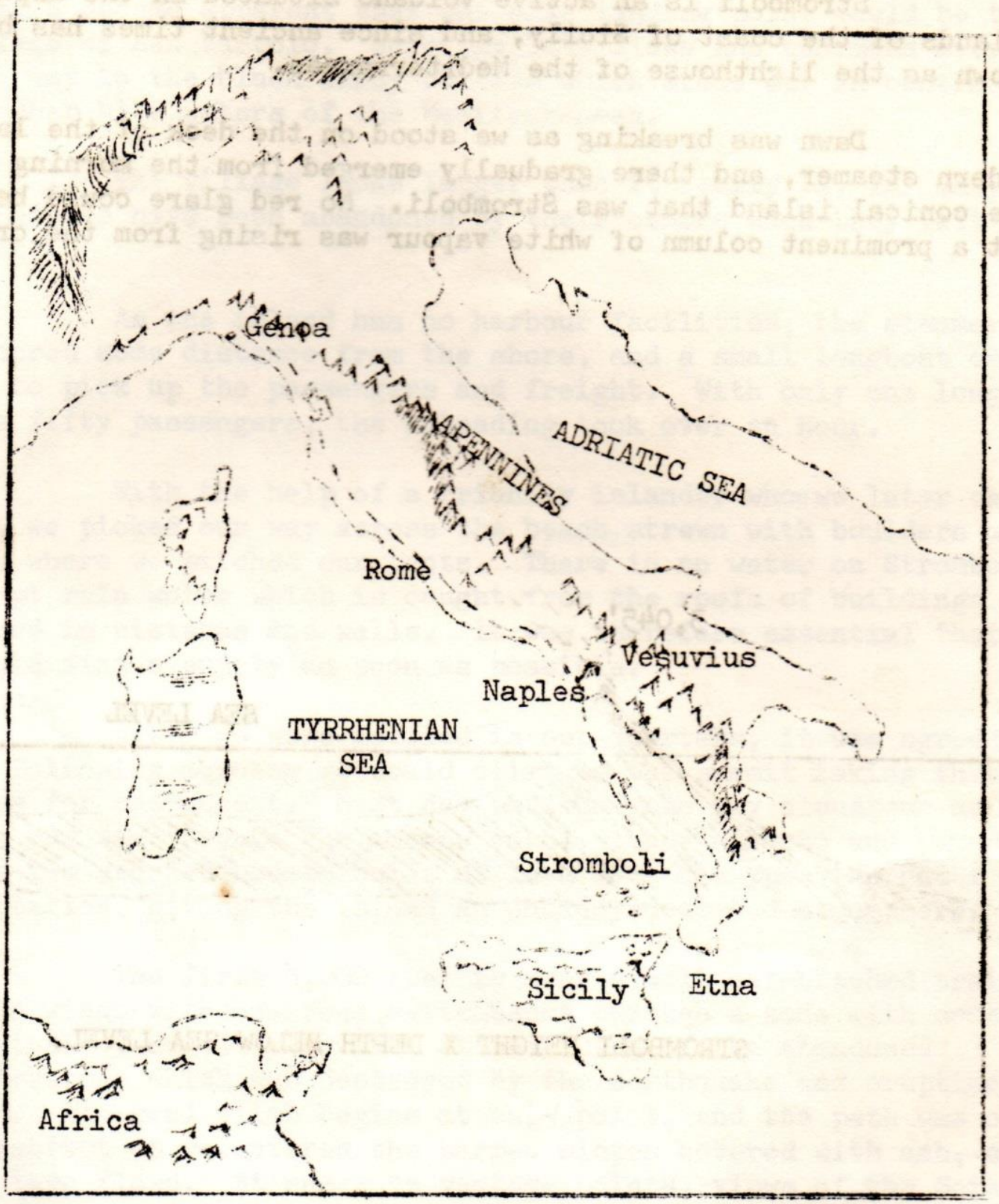
The disadvantage of travelling by train was that we could only take a limited amount of equipment, so it was agreed that we would use the school mini-bus to transport equipment, food and three passengers. This proved to be an ideal arrangement, with the rail party and mini-bus meeting at Genoa in Northern Italy. The train journey had taken some 24 hours, and the lack of sleep through sitting up all night was overwhelming. And it was not long before we found ourselves again speeding into the night, sitting up for the second night running, but this time in the mini-bus and only the thought of sleep in our minds. Our destination - the island of Stromboli.

What is a Volcano?

In simple words, a volcano is an opening in the surface of the Earth. From time to time, gases, dust, ashes and molten rock are forced through this opening from deep down inside the Earth. They may be forced out one after another or they may all come rushing out together, often with a loud explosion. When this happens, we say that the volcano is erupting, or that a volcanic eruption is taking place.

Molten rock is rock that has been melted by very great heat deep inside the Earth. When it bursts out of the opening and flows down the mountain, it is called lava. The lava usually moves slowly, but sometimes it may flow quite quickly, especially if the slope of the mountain is very steep.

Generally we think of a volcano as a hill or mountain, with smoke and flames coming out of the top. However, a volcano begins its life through a crack in the ground, and the ash and lava slowly build up into a hill or mountain, called the cone of the volcano.



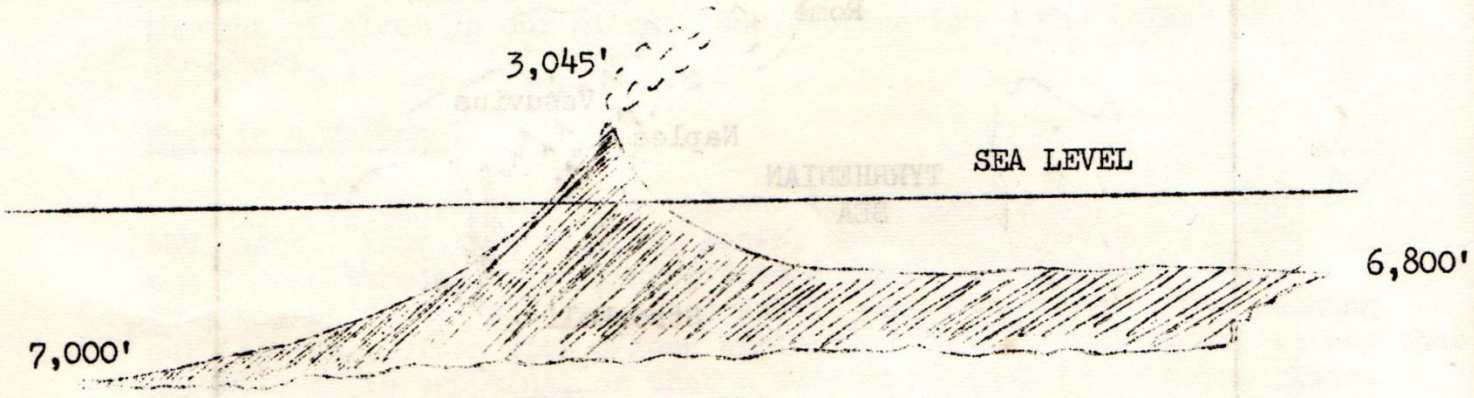
ROUTE OF EXPEDITION ACROSS ITALY

THE STROMBOLI SURVEY

Crater of Fire

Stromboli is an active volcano situated in the Lipari Islands of the coast of Sicily, and since ancient times has been known as the lighthouse of the Mediterranean.

Dawn was breaking as we stood on the deck of the large modern steamer, and there gradually emerged from the morning haze the conical island that was Stromboli. No red glare could be seen, but a prominent column of white vapour was rising from the crater.



STROMBOLI HEIGHT X DEPTH BELOW SEA LEVEL.

The approach to Stromboli is impressive because the mountain rises straight out of the sea to a height of 3,045 ft., and so it has the appearance of great size. As the boat steamed around the edge of Stromboli, the 'big scar' on the slope, known as the Sciara del Fuoco ('ski of fire') stood out prominently. This remarkable feature has a slope of 35° and a width of $\frac{3}{4}$ mile, and has for thousands of years been the passage for lava and fire fragments.

These are at times shot from the crater, amazingly far into the sea, where they make huge splashes and sink.

The boat was approaching the north of the island, and it soon became apparent that the only landing point would be the village of San Bartolo. Here the lava flows and enormous overhangs give way to the black sandy beaches which stand out in contrast to the deep blue waters of the Mediterranean.

The village looks larger than it really is, for many of the houses have been abandoned by their owners when they left the island.

As the island has no harbour facilities, the steamer anchored some distance from the shore, and a small longboat came out to pick up the passengers and freight. With only one longboat and some fifty passengers, the unloading took over an hour.

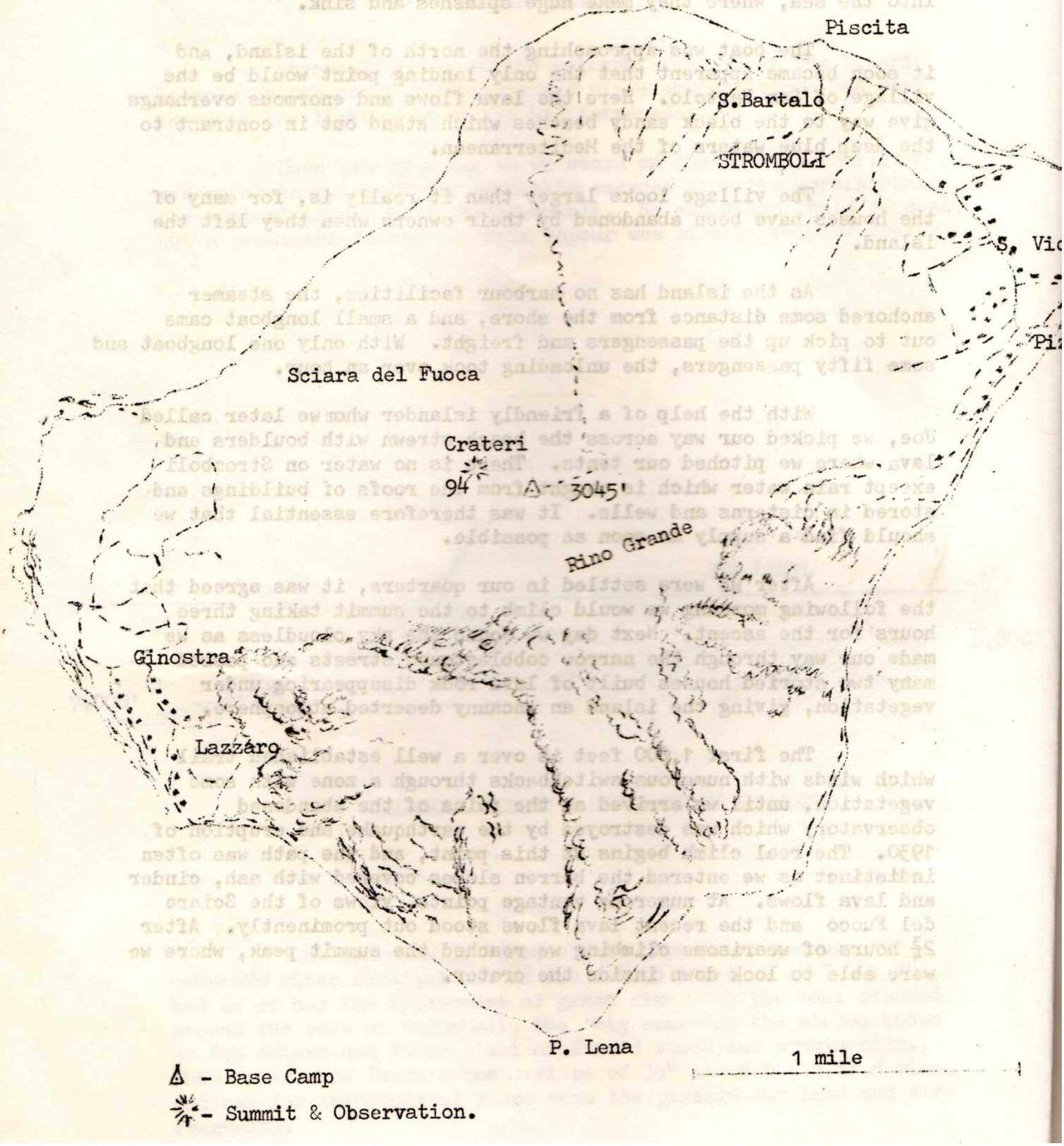
With the help of a friendly islander whom we later called Joe, we picked our way across the beach strewn with boulders and lava where we pitched our tents. There is no water on Stromboli except rain water which is caught from the roofs of buildings and stored in cisterns and wells. It was therefore essential that we should find a supply as soon as possible.

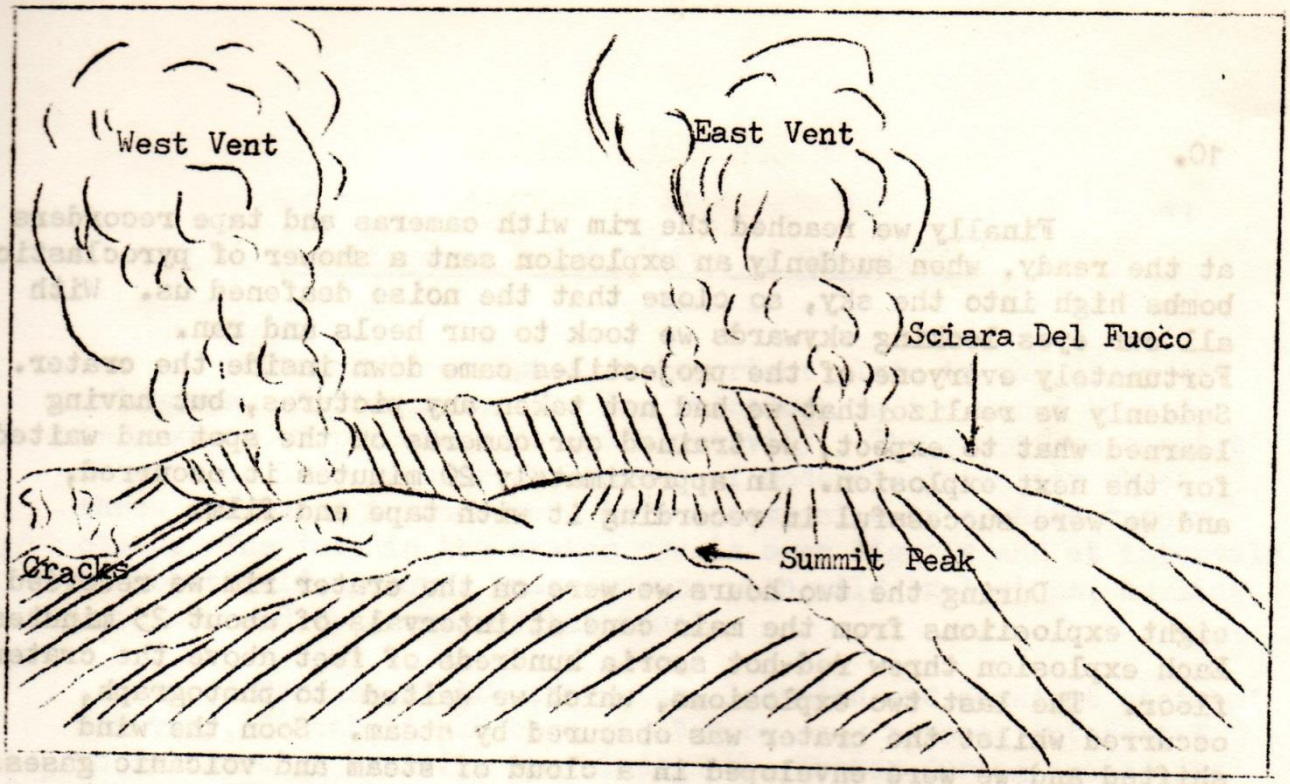
After we were settled in our quarters, it was agreed that the following morning we would climb to the summit taking three hours for the ascent. Next day we found the sky cloudless as we made our way through the narrow cobblestoned streets and passed many two storied houses built of lava rock disappearing under vegetation, giving the island an uncanny deserted atmosphere.

The first 1,000 feet is over a well established trail which winds with numerous switchbacks through a zone with some vegetation, until we arrived at the ruins of the abandoned observatory which was destroyed by the earthquake and eruption of 1930. The real climb begins at this point, and the path was often indistinct as we entered the barren slopes covered with ash, cinder and lava flows. At numerous vantage points, views of the Sciara del Fuoco and the recent lava flows stood out prominently. After $2\frac{3}{4}$ hours of wearisome climbing we reached the summit peak, where we were able to look down inside the crater.

ISOLA DI STROMBOLI

(Comune de Lipari)





CRATER OF STROMBOLI, APRIL 1968

From this point we decided to observe the intervals between the explosions and study the nature of the outburst before taking the party any nearer. Unfortunately the bottom of the crater was not visible from our position, but two columns of vapour boil out like smoke from a ship's funnel. There were also peculiar sounds coming from within the crater. The noise is more of a "sloshing" sound, or like that of quickly escaping steam. Another made a "shunting" noise as the lava boiled below. This exhaustive noise was interrupted at intervals of 13 minutes to 25 minutes with a stupendous bang which ejected glowing lava to a height of 600 ft. above the crater floor. Occasionally the steam and gas column would drift towards us, and the presence of sulphur and chloride was readily detected.

Finally the wind changed direction and it was agreed that a party of five should attempt to reach the edge of the crater rim. With helmets, cameras and tape recorders we scrambled down the ash slopes towards the crater.

A number of fumeroles were discharging steam, while deposits of yellow salts were forming around the openings, and even the cinders were getting hot from the noonday sun. To our surprise the ash was hot a few inches below the surface, and any large hole soon became an active steam fumerole. There were frequent explosions, and we could hear rocks falling back into the crater after each explosion Occasionally after an explosion the crater would be free of steam for a few seconds permitting a glimpse of the crater floor.

Finally we reached the rim with cameras and tape recorders at the ready, when suddenly an explosion sent a shower of pyroclastic bombs high into the sky, so close that the noise deafened us. With all our eyes looking skywards we took to our heels and ran. Fortunately everyone of the projectiles came down inside the crater. Suddenly we realized that we had not taken any pictures, but having learned what to expect, we trained our cameras on the spot and waited for the next explosion. In approximately 20 minutes it occurred, and we were successful in recording it with tape and film.

During the two hours we were on the crater rim we recorded eight explosiions from the main cone at intervals of about 25 minutes. Each explosion threw red-hot scoria hundreds of feet above the crater floor. The last two explosions, which we waited to photograph, occurred whilst the crater was obscured by steam. Soon the wind shifted and we were enveloped in a cloud of steam and volcanic gases. Hastily gathering our equipment we rejoined our party and made our descent to the village below.

Significance and Activity of Stromboli

Stromboli occupies an important place in the study of volcanoes. It is one of the few volcanoes in the world that is in a state of permanent moderate activity. The eruptions consist of more or less regular explosions of moderate intensity which throw out pasty incandescent lava accompanied by a white vapour cloud. The lava in the crater crusts over lightly and at intervals of about half an hour gases escape with mild explosions, hurling out lava and fragments of the crust.

Because of its convenient location and constant state of activity, Stromboli has been visited by many persons interested in volcanoes. Tazieff, who visited the crater during one of its more active periods describes an eruption as follows.

"I am right in the middle of it all. With my shoulders hunched up, head drawn back, I peer into the vault of sinister whining and whizzing. All around bombs are crashing down, still pasty and soft, making a succession of muffled plops. One dark mass seems to have singled me out and is heading straight towards me. Instinctively I take a leap to one side and feel the great lump flatten itself out a few inches from my foot. Here comes another projectile. I take another leap to dodge it. It lands close beside me. Then suddenly the humming in the air begins to thin out. There are a few more whizzing sounds and then the downpour is over."

Fortunately for us on our visit, the activity of Stromboli showed considerable variation from Tazieff's description. Rather Stromboli has a Solfataric phase, when no activity is in progress. For many years, because of the selection of Stromboli as a type of classification of volcanoes, it was believed that it had a constant uninterrupted activity consisting of rhythmic explosions. This is far from true, but the idea is widely held because of the terminology of the classification.

Lava flows are far more common and violent eruptions shake the entire island. Luckily the rim of the crater acts as a shield and protects the two villages on the island from the full fury of the eruption. Nevertheless, the eruptions cause considerable damage and occasionally lives are lost. Lava flows usually develop on the Sciara del Fuoco and frequently one or more streams will reach the sea. During the past two decades strong eruptions have occurred at intervals of two to three years. A particularly violent eruption, in which five lives were lost and in which property damage was high, occurred in 1930.

The lava from Stromboli is basic in character and is classified as a basalt. As long as the lava column is kept open by frequent explosions, normal activity prevails. If the vent becomes clogged, then more rigorous explosions are required to remove the obstruction.

Small but well-formed augite crystals are exceedingly abundant in the ash and cinder making up the cone of Stromboli. As the lava is shattered by the explosions the augite crystals are deposited along with the resulting ash and cinder.

The position of the Sciara del Fuoco could account for the continued activity of Stromboli which causes most of the ejected material to roll into the sea, rather than fall back into the crater and clog the conduit. Without this accumulation of debris which would stop activity until enough pressure develops to remove the obstruction, Stromboli continues its more or less regular eruption. Whatever the explanation, Stromboli is almost unique among the volcanoes of the world in that it has been in a constant state of activity for more than 2,500 years.

Activity of Stromboli

	Vents		
	(Main)	(Sub)	(Sub)
	1	2	3
Time	6.45	6.51	6.55
	7.0	7.10	6.58
	7.13	7.25	7.30
	7.33	7.43	7.45
	7.58	8.03	8.06
	8.11		

PRESTIGE OF VESUVIUS AMONG VOLCANOES

As only a brief visit was made to Mount Vesuvius and Pompeii, a detailed report therefore cannot be made. But the following information may be of interest. Mount Vesuvius (4,000 ft.) on the shore of the Bay of Naples in central Italy, is probably the best known dormant volcano in the world and located in the midst of one of the most densely populated areas in Europe. It is also in the area where the first Greek settlements were made more than eight hundred years before the Christian era. The record of activity is therefore far more complete for Vesuvius than for any other volcano, and many ideas concerning volcanoes were developed from observations of Vesuvius.

Italy has long been a favourite recreation centre, and Vesuvius is still one of its chief scenic attractions.

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Detailed observations on the activity of Vesuvius extend back for several hundred years. From a close study of records, vulcanologists have been able to predict, at least to some extent, the pattern of activity of an eruption. The recognition of the cyclic behaviour of Vesuvius, stimulated other workers to try to establish patterns for other volcanoes, and their results proved to be an important step in the advancement of volcanology.

Following the 1944 eruption, Vesuvius lapsed into a repose period in which it remains today. For the past three hundred years the repose period has averaged about 7 years. Vesuvius is now in its 24th year of repose, so it is apparent that a renewal of activity is long overdue.

The Destruction of Pompeii

Two thousand years ago, Vesuvius was a green and pleasant mountain overlooking a bay. Wealthy Romans built summer houses on its slopes. Grape vines and pasture grass grew in its rich soil, and towns dotted the lower slopes.

The Romans knew Vesuvius was a volcano, but they thought it was extinct. In the year AD 79, the morning of August 24th, Vesuvius erupted with tremendous violence. When the eruption ended the towns of Pompeii and Herculaneum were buried.

At the time of its destruction, Pompeii had a population of about 20,000. The fifteen to twenty-five feet of pumice and ash which buried the city, not only killed many of the inhabitants, but also preserved in a unique fashion a record of life and customs of the times. The material which buried the city consisted of pumice varying from the size of a pea to fragments three inches in diameter. Overlaying this bed is a hardened layer of ash varying from 6 to 7 ft. For the most part the pumice is loose and unconsolidated, a factor which makes excavation much easier than at Herculaneum which was covered by a mud flow. A good topsoil has developed on the surface, and today trees and cultivated fields of corn are growing on the unexcavated parts of Pompeii.

About one half of the city of Pompeii has been excavated and some 2,000 skeletons have been found. Many were discovered with their hands or clothes in their mouths, apparently trying to keep out the lethal gases. Others were killed by falling roofs, or were trapped in buildings in which they sought refuge. The discovery of many bodies near the sea indicates that the victims were fleeing with their most precious belongings. It is possible that suffocation from the great quantity of fine dust was the cause of their death.

Volcanoes and Man.

No-one can stop a volcano from erupting. But vulcanologists are learning to tell when and where an eruption will take place. They are hoping to control lava flows, mud flows, and gases. As a result they can protect people who live near volcanoes, to some extent. It may seem strange to find people living near an active volcano, but many have nowhere else to live. Perhaps the most important reason is fertile soil. Volcanic regions are among the most fertile in the world and so people have clustered to them. Another reason is their supply of steam and hot water in some parts of the world.

Permanent observations are being maintained on some of the world's active volcanoes. The work which is being done is highly significant, but the real approach to the problem cannot be made until observations, with the most modern scientific equipment, are maintained at every active volcano on earth.

GLOSSARY

Basalts - lavas belonging to the sub-division of basic rocks. Dark in colour, turning brown, relatively rich in iron and magnesium.

Bomb - lava ejected from inside the crater by action of gases. They may be of any size from a nut to a railway wagon, and take their shape whilst flying through the air.

Lava - Magma that reaches the earth's surface is called lava.

Magma - A molten substance found under the crust of the earth.

Cone - The hill or mountain built up by the lava and ash.

Crater - The deep hollow at the top of the volcano.