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THE TIGER'S LEAP

C. P. FITZGERALD

JUST over 100 miles north of the Burma Road the city of Likiang stands in the long loop of the Yang Tze. In the western arm of the loop, where the river turns to run almost due north, lies the great gorge between the snow mountains Ha Pa Shan and Yu Lung Shan, the gorge which the Chinese call Hu T'iao Chiang, the Tiger's Leap, and which, so far as it is known at all, is usually called the Likiang gorge by foreign travellers.

When I was living in Tali in 1937, I visited this place with Mr. Gerald Reitlinger and Mr. W. Hope-Johnson, who were on a winter journey through Yunnan. They had heard of the gorge from Dr. Rock of Kunming, who had visited it on more than one occasion during his long residence in Likiang. The winter is a pleasant time for a journey on the Yunnan plateau. The sun shines every day, and rain can be all but discounted. The air is cool and crisp at night, but warms up rapidly when the sun rises. After the wet season of late summer, when one must remain in the city and vicinity, cut off by mist-wrapped mountains, and washed-out roads, the clear skies and warm dry sun of early winter inspire an irrepressible wanderlust. So when Reitlinger asked me to go with them to the gorge and beyond, taking in the northern Min Chia districts of Kienchwan and Shihku, I accepted without a second thought.

It was decided that we should travel up to Likiang by the road through Kienchwan, which is one of the main caravan routes of northern Yunnan by which the tea goes up to Tibet. At Likiang we would decide on the best way to penetrate the gorge, for as is usual, no Tali muleteer had apparently ever heard of the place. This did not surprise me. Muleteers are practical men, working freight over a section of one of the great caravan routes. What should they know about some strange and inaccessible spot on the road to nowhere? There might be men who knew the gorge, and other such places, only too well, but these men would not be my choice as travelling companions. Men who know a district other than their own so well, know it for no good purpose. A Tali guide who knew the Likiang gorge would almost certainly be a bandit.

We started in the middle of December and reached Likiang in five days, the normal time for this stage. From Tali to Likiang the road passes through no scenery exceptional in Yunnan. There are only two passes, one between Niukai and Kienchwan, from which the first full view of the magnificent snow mountain is obtained; the other, the pass between the basins of the Mekong and Yang Tze above Likiang itself, from whence the plain stretches to the foot of the great mountain behind which lies the gorge. This mountain, not marked on Davis's map or on the Survey of India sheets, appears on one American map as "Satseto," a curiously Japanese sounding form, and is marked on a modern Chinese map as Yu Lung Shan, the Jade Dragon Mountain. In the opinion of Dr. I. A. Richards, who had just returned from a prolonged climber's reconnaissance of its icy peaks, it is not less than 20,000 feet.

It is sometimes also called the Likiang snow mountain by foreigners in Yunnan, and perhaps a word on these various names may not be out of place.

Snow mountain—Hsueh Shan—as the peak is called by Tali men (it is just visible from the Tali plain), is just a local name, the obvious and recurring local name for any mountain high enough to have perpetual snow in west China. Satseto is a corrupt version of a Yunnan dialect name pronounced in the Min Chia manner. It should be Shan Tzu Tou, "the fan shaped steep." Yu Lung Shan, the literary Chinese name which appears on official Chinese maps, is obviously the correct cartographer's name. On the other side of the gorge, unmarked on any map, rises Yu Lung Shan's only slightly lower rival, Ha Pa Shan, which Dr. and Mrs. Richards climbed in November 1937. The name, which has an un-Chinese sound, is possibly the local pronunciation of Han Po Shan, meaning Cold Slope Mountain.

Likiang city is a kind of Chinese Peshawar, without cantonments. The last administrative city of Yunnan, beyond which the country is ethnographically Tibet, whatever its political allegiance, it is a famous meeting place and market for the border peoples. Its narrow twisting planless streets, unlike the characteristic rectangular walled cities of Yunnan, are reminiscent of some south China city of Hunan or Kwangtung. It is, apart from one or two temples, without any buildings of distinction. Yet it has charm. Here one is on the edge of two worlds. Here the immense, integrated and age-old city and village culture of China meets and yields to the tent-dwelling nomads of the high grassland plateaux of Tibet. In Tali, a Tibetan nomad, fanning his grimy body against the "heat" of a mere 7000-foot plateau, is an uncouth and alien, if fairly familiar sight. In Likiang, much colder although only 1000 feet higher, the tall, high-booted nomads shoulder through the packed lanes with lordly ease. There are other races too. The Min Chia villages reach almost to the city which serves as their market town. The inhabitants of the city itself are Na Khi (or Mo So) a strange people with a culture and religion derived more from Tibet than China. There are also Li Su from the mountains farther west, smaller, rather furtive, timid-looking men with the light tread of those who never walk long on level ground.

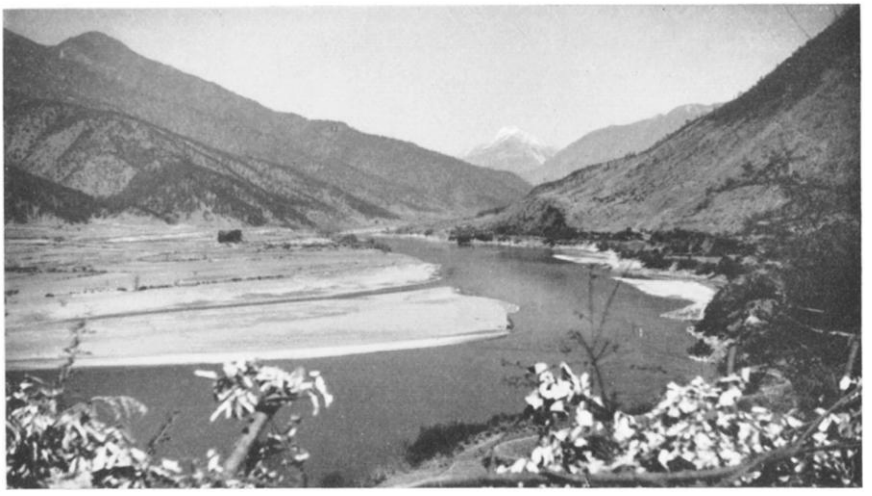
Our immediate problem was to find, among this varying population, one reliable guide who knew the gorge and how to get there. In this, as in so many other matters, we were indebted to the kindness of the resident missionaries. Miss Scharten, a lady of a great Dutch family, who has chosen to exile herself in this far-off place in a lifelong endeavour to convert the Na Khi to the Protestant faith, was both well informed and helpful. She herself had a small out-mission station at Taku, a ferry on the Yang Tze just below the downstream opening of the gorge itself. She and her assistant missionary ladies were accustomed to visiting Taku two or three times a year, preferably in the winter, for the village, lying in the deep valley of the Yang Tze at only 6000 feet, is much warmer than windswept Likiang. She was therefore able to give us information about the road to Taku and supply a guide, but she had never visited the gorge itself. The problem we were most anxious to solve thus remain unanswered. Was it possible to take horses through the gorge or was there even a foot-path of some sort passing through it? Opinions varied. Some said it was perfectly possible to ride through the gorge: others as vehemently asserted that one could not in any way enter it at all. Taught by some experience of the motives which influence a peasant's statements,

Likiang city

Street in Likiang

Village near Kienchwan

Yu Lung Shan from Likiang



The Yang Tze above Kiaotow. Ha Pa Shan peak in the background

Ha Pa Shan and north entrance to the gorge from Taku

we pinned faith to neither view. The muleteers, anxious for their beasts and feeling thoroughly at sea off a main caravan road, were the pessimists. My indomitable, excellent, and habitually opium-smoking cook, Ho, was the optimist. To Ho no road is impassable and none so steep that he feels called upon to dismount.

We finally left Likiang with the question no further advanced. At Taku, all agreed, the local men would know. There is no road from Likiang to Taku; travellers make their way across the plain below Yu Lung Shan and then across the northern spurs of the range, here covered with a far-stretching virgin forest of pine, ilex, and rhododendron. The total distance was said to be about 70 miles, but as we did it in two and a half days it is probably more nearly fifty. The *li*, the Chinese unit of measurement, in theory a third of a mile, varies in length with the roughness of the road. Our guide was a Tibetan boy from the mission, named Hua, who had the very unmissionary habit of drinking raw Chinese rice spirit straight from the bottle as he walked along. To the Chinese, who only drink at feasts, this seemed barbarous indeed. Hua spoke Chinese much as an African native speaks English, broken words with a wealth of gesture to help them out. Ho treated him with the kindly indulgence one might show to a pet monkey: an example of the true and ancient Chinese attitude to foreigners, still practised in the far interior to all from foreign lands, near or far.

It may have been the icy blasts which swept across the bare plain at the foot of the Jade Dragon mountain, or merely long practice, but Hua's indulgence in the bottle did not appear to produce any visible ill-effects. He guided us surely and well up into the trackless forest of spreading ilex and then down a breath-taking bamboo-clad slope, made slippery by thawing frost, to the rhododendron-edged banks of a rushing stream. The spot is called Paishui, the white water, and there are glades of grass among the rhododendrons where the horses could be grazed and tents pitched. It was the shortest day of the year and we camped out round a fire of rhododendron logs at an altitude of something over 10,000 feet. It was not cold out of the wind in the rain forest.

The whole of the next day the road wound up, over and along the interminable forested spurs of Yu Lung Shan, divided by powerful rushing streams. From time to time one caught fine views of the peak itself or of Ha Pa Shan, and we tried in vain to see just where the mighty Yang Tze could have forced its way between these two twin and seemingly conjoined snow-clad mountains. Taku we knew to be only 6000 feet, and Shihku above the gorge, not much higher. How then did the river pass through an apparently continuous range which is certainly not less than 19,000 feet high? There must be a gorge indeed.

At evening we came out of the forest where two or three Na Khi cottages, made of pine logs in a style reminiscent of Canada, crouched on the hillside beyond the last trees. These were the first habitations seen since the villages of the Likiang plain. The Chinese, hailing any building however unprepossessing with unfeigned delight, rejoiced to think that they did not have to camp out again that night, even under a perfectly adequate tent. We inspected the smoke-grimed interior of these hovels with less enthusiasm, and preferred

our tents pitched on a bare field across the road. The Yunnanese, although sometimes compelled to do so, loathe to "strike wild," as the local expression for camping puts it, literally translated. All their Chinese pride and urban-cottage background rises against what they feel to be the degrading custom of nomad savages. The Tibetan grasslander is too filthy even to be admitted to a Chinese inn when he visits the Yunnan markets. He camps outside the city walls. To do the same has, I think, in Chinese eyes a similar implication. So it was throughout the journey. Where any roof could be found, however small, choking with smoke and grimed with dirt the den might be, the Chinese all with one accord piled into it. We clung to our tents and endured the superior smiles of the paternal Mr. Ho.

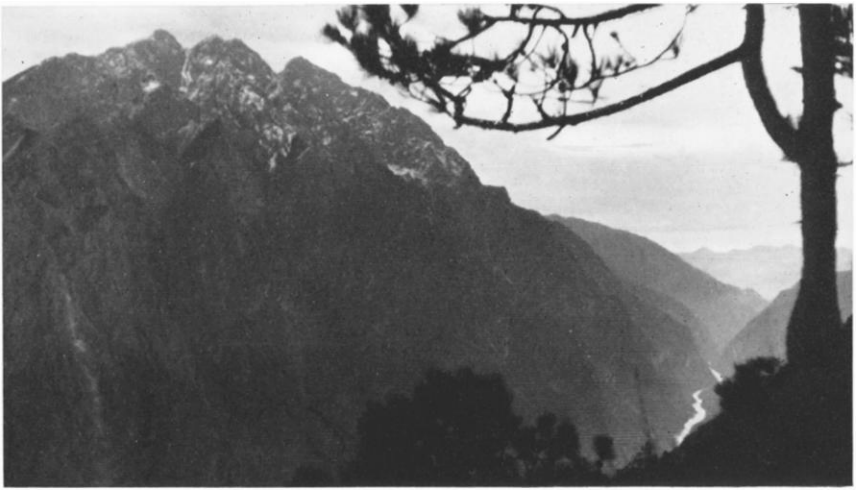
Taku, which lies below the forest edge is nothing but six or seven Na Khi houses among a few sun-baked rice fields in the hot erosion valley of the Yang Tze. All round tower great hills. To the south-west the twin peaks of Yu Lung Shan and Ha Pa Shan still seemed one solid mass, in which, though not 5 miles away, one looked in vain for the opening of the Yang Tze gorge which must divide them. Below the village the Yang Tze ran in a deep slit 300 feet farther down, and it ran swift and clear as a mountain stream. " I will drink from it to-morrow," I thought, with memories of the last place I had seen the river, the murky yellow flood waters of Nanking. And on the next day I did.

The inhabitants of Taku are a sun-dried, torpid race, their energy sapped by the close air of that deep walled-in spot. They could see no reason why one should go through the gorge. To reach Shihku, at the other end, they said, was much easier from Likiang, by the main road. No doubt; but was there a path through the gorge? " Yes," grudgingly, "there was a path, but it might have fallen in, no one had been to look." No one, clearly, was going to care. "Did people ever pass through that way?" "Yes, they did." "With horses?" "Perhaps, but it would be easier with horses to go round by Likiang . . ." and so on and on, with their wearisome inability to grasp the new idea that we really wanted to go through the gorge.

In the end we hired four Taku men to carry our baggage if, as at the last was still uncertain, the gorge path proved impassable to beasts. Perhaps, indeed probably, this was the result which the Taku men hoped to achieve by their evasive answers. They feared that if they said horses could pass through, we would not hire porters.

The river is crossed by paddling a long boat laboriously along the bank and then shooting down diagonally across the swift stream to the rocky cliff opposite, an operation not without risk when restive horses are among the passengers. After climbing on to the erosion terrace 300 feet above the river and going up stream towards the gorge for a couple of miles we had to camp near a tiny and extremely dirty Na Khi hamlet. It was still early in the afternoon, and we protested. Beyond the village we could see great pine forests sweeping up the flank of Ha Pa Shan. That was our road the next day, they said. Why not, then, go part of the way to-night and camp in the woods? I felt that the adamant and unanimous refusal of porters and muleteers alike was really due to nothing but the Chinese hatred of "striking wild." But they advanced a reason which no traveller can ignore. "There is no water there," they said,

The gorge entrance from Taku. Yu Lung Shan to the left



The Tiger's Leap. The Yu Lung Shan precipice

The middle stretch of the great gorge, looking down stream

Ha Pa Shan and the Yang Tze valley at Taku

The Yang Tze below the gorge at Taku

The ferry at Taku

"no water all to-morrow's ride either, till we strike it in the gorge." It seemed a most unlikely story. No water in Yunnan, that land of rushing streams? We yielded, but resentfully, and disbelieving. Yet it proved true. Except just after heavy rain there is no water on all the eastern slope of Ha Pa Shan, and very little in the gorge itself.

All the next morning we toiled up those pine-covered slopes, passing dry stream beds and found no spring. The climb was stiff and long, and when we camped for a late midday halt and still had no other water than what we had brought up with us, we did not regret our wisdom in yielding the night before. The place that the guides chose to halt for the midday meal seemed at first sight just another clearing in the pine woods with a spur of rock running down above it. The top of the mountain towered far out of sight above the woods, although we must now have been at 13,000 feet. So far we had looked in vain for the gorge. We had indeed when starting seen the opening like a great cleft made by an axe stroke in the solid chain of the mountains. We had then turned away into the pine woods and climbed so steadily that we had begun to believe that this famous gorge path passed along the side of the mountain above the gorge, and not through it. This might explain the contradictory Likiang stories, that one could ride through the gorge, or that it was not possible to enter it.

Hope-Johnson however had climbed up the spur through the trees, looked, and now shouted down to us eagerly. We scrambled up. There it was, at our very feet, sheer and terrifying the cliff fell away, surely a full 10,000 feet, to the white slit of the river foaming between dark walls of rock. Across the chasm, which on this side showed ledges and terraces here and there, the cliff was an absolutely unbroken drop from the snow-line of Yu Lung Shan, not less than 15,000 feet, down to the river soundlessly rushing over cataracts at 6000 feet. Looking up stream, the cliffs gradually diminished until at a distance of 20 miles or so one glimpsed the upper entrance. We saw now why we had climbed so long. From Taku there is no possible road between those monolithic gates of stone: the Tiger's Leap. Fantastic as the name appears it well expresses the dwarfed insignificance of the little silver thread which is all the mighty Yang Tze, really fully 200 yards wide, seems from that dizzy spot.

How wide the river really is in the gorge, we found no chance to judge. The path we followed all that afternoon and all the next two days, loops and climbs, descends breathtakingly wriggling down the face of a cliff or winds far up the slope to cut round a tributary ravine, but nowhere and never falls to within 1000 feet of the river itself. In this titanic landscape all sense of distance and judgment of size is overwhelmed. The gorge is not more than 20 miles long as the crow flies, but it takes three days to traverse it. The windings of the path made necessary by cliffs and ravines make the distance at least three times as great.

The track is rough and tortuous, but never impassable, and presents no real difficulty for horses provided they are led and unladen. The only danger which seemed real was the wind. It came suddenly roaring down the gorge like an express train till it rose to a crescendo of flying dust and small stones, then instantly was gone. When we heard these gusts coming, we waited

before passing the jutting corners on the cliff face round which it swept in full force. I noticed that the muleteers covered the horses' eyes with a cloth.

It was with real surprise that when we camped on a narrow ledge just wide enough for tents, we found round the next corner, to the delight of the Chinese, a wretched hut in which a Na Khi woodcutter lived. It was hard to see why any one should choose so grim a dwelling place and one so far from all amenity, unless, like the woman whom Confucius found lamenting over her son, slain by a tiger, it was because here at least there was no oppressive government. The woodcutter had chickens for sale and we dined on these, even the gorge wind being unable to prevent Ho from building a fire to roast them. The Taku Na Khi ate every scrap of their bird, guts included. Hope-Johnson watched them in the firelight, and murmured:

"How in the Alps he ate strange flesh, which some did die to look upon."

The second day through the gorge, at a turn of the road where the going was easier, we suddenly encountered a troop of armed and mounted men, their leader carrying an automatic pistol. The situation seemed equivocal. They were astonished, we were not unperturbed. Neither side could pass or retreat without considerable manoeuvring. If this was a hold-up, it was certainly well chosen. Ho hurried forward: bandits, or whatever they might be, were all one to him. He had the imperturbable superiority of the Szechwanese who has long lived in Yunnan, on a par with that of the Peiping man in the northern provinces. "Your honourable name, Sir?" he inquired of their leader. The chieftain bowed, replied, and soon all was as polite and formal as a banquet in Ta Li. He was, it seemed, anything but a bandit: on the contrary, he was the Na Khi *Tu Ssu* or local chief of Kiaotow, the village at the head of the gorge, and he was riding through to collect taxes. So the poor woodcutter had not escaped the government after all. That night we camped for the last time in the gorge, pitching the tent on the path itself for lack of any other level ground. Even so, we had to choose a corner where a waterfall splashed down, and during the night covered the back of the tent with ice from its wind-driven spray. It was Ho who suggested the road itself as a place to pitch the tent. "But what if any one comes along in the night?" we asked. Then he made a reply which was made to me once before in his native Szechwan where they build the inn courtyards right across the mule paths. "Honest men do not travel at night," he said.

Our last day in the gorge, when after many windings, we finally began to make direct progress towards the southern entrance, was almost an anti-climax to the fearsome cliffs of the Tiger's Leap. By any other than the overwhelming local standard, these southern approaches would be formidable and astonishing, but any one who wishes to visit the gorge should, for preference, enter by the long climb from Taku, as then the full tremendous gulf comes suddenly and quite unexpectedly into view. It is unfortunate for the traveller that this should be so, for the Tu Ssu of Kiaotow, in whose home we were next night royally entertained by his order, is the one man in the countryside who is really familiar with the gorge paths, and both able and willing to impart his knowledge and give his help. We should undoubtedly have been saved much tiresome misinformation if we had approached the

gorge from Kiaotow, but on the other hand the effect is incomparably more magnificent if the journey is made from Taku.

I am not competent to offer an opinion of value on the geological formation of the gorge, nor to explain the reasons why the Yang Tze should pass through the two highest mountains for many hundreds of miles, instead of continuing its south-eastward trend as do the Mekong and Salween in their parallel courses. Yu Lung Shan and Ha Pa Shan, like T'sang Shan at Tali, are almost detached mountains, very much higher than the ranges around them, but unlike T'sang Shan, which is an upthrust of granite breaking through the limestone formation of Yunnan, the mountains beside the gorge are themselves of limestone. The river terraces and erosion bed of the Yang Tze at Taku would indicate a long-continued process of cutting downwards by the river, but in the gorge itself, especially on the Yu Lung Shan bank, there are no terraces, only a sheer unbroken wall of blank rock.

That, in a way, is an idyllic picture of peaceful effort and of constant although slow improvement. All that was put an end to in a violent way, and the whole of the work will have to be begun anew. When I consider how slow and how difficult was the beginning of that work, and when I recall the tragic history of those lands, the backwardness and the slowness are explained. Perhaps our children will be more impatient, seeing how in many parts undeveloped and primitive life has remained. They perhaps may forget even in our country, certainly in foreign countries, the strong, tragic, and serious reasons there were for that backwardness. I hope that in spite of the incredible disasters, in spite of the destruction of so many houses and towns, many of which have disappeared or been largely changed, fortunately the large towns, such as Lwów and Pińsk, have suffered less than some others, and many of the private houses will not for ever cease to exist. I hope that in spite of the unspeakable disaster and the great wreckage all over my country, we shall before long be able to re-start our work, and perhaps in better conditions and with more prospect of stability than during the last twenty years. I trust that when the war is over we may find in Great Britain, and in the west in particular, the source not only of moral but of material help which will speed up our important work.

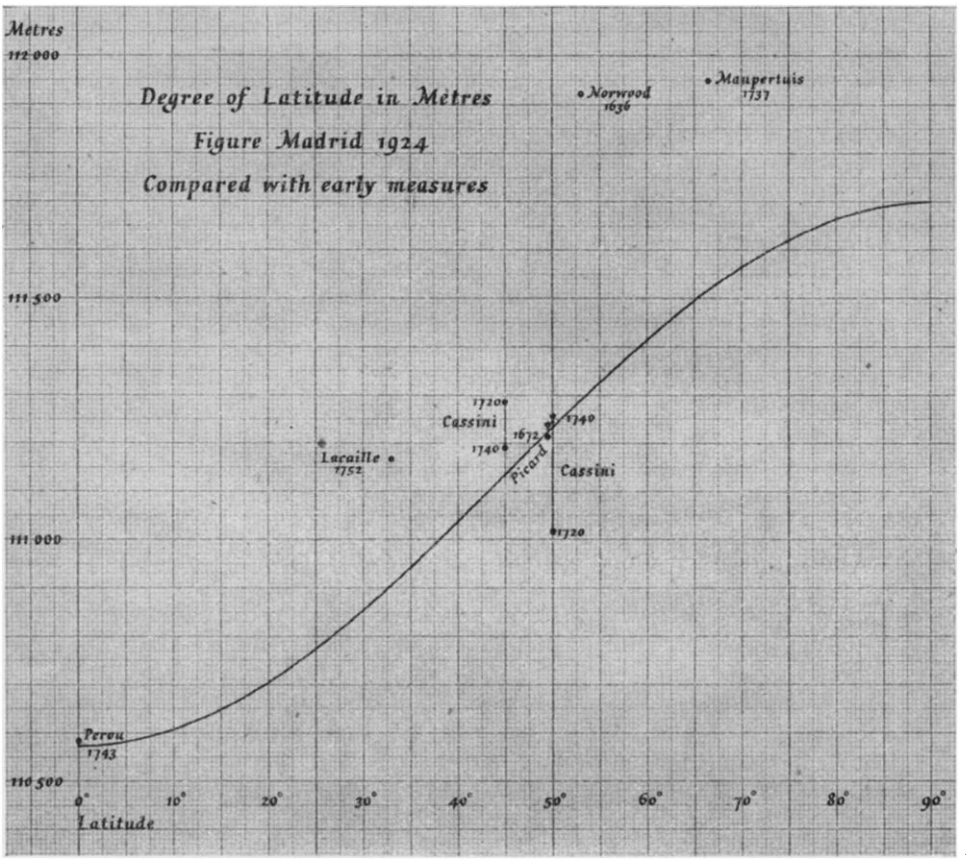
The PRESIDENT: His Excellency has made most illuminating comment on a particularly interesting paper on a part of the Continent about which, considering it is in the heart of Europe, many people know extraordinarily little. Some of you may have known something about Eastern Poland, but to me it was an almost *terra incognita*. I am sure we all feel grateful to Sir John Russell for his most interesting paper.

MAUPERTUIS AND THE FLATTENING OF THE EARTH

EARLY in the history of geodesy, before there was any accurate knowledge of the Earth's size, the question of its shape, whether the polar axis was longer or shorter than the equatorial, was a matter of acute controversy and lively public interest. Newton had shown that if the Earth had solidified from a rotating fluid it must be oblate, the polar axis shorter than the equatorial. The measures in France under the direction of the Cassinis, on the other hand, made the length of a degree shorter instead of longer as they went north, which implied that the earth was prolate. To settle the matter the French academicians, with great public spirit, fitted out two expeditions, one to the polar circle, the second to the equator, and the results brought back from Tornea by Maupertuis seemed so conclusively to prove the flattening that, without waiting for the more leisurely operation of Bouguer and de la Condamine on the Arc de Pérou, it was admitted that Maupertuis had, in the famous words of Voltaire, "aplati les poles et les Cassinis."

These operations are famous in the history of geodesy, but one does not see any concise statement of the accuracy which was achieved. Some ten years ago, for a lecture in a University, a diagram was made in which the various determinations of the length in metres of an arc of one degree of latitude are compared with our modern figures, which could conveniently be done then, but not much earlier, because our Society had recently published, in 1927, the

first complete tables of Arcs of Meridian, from the equator to each ten minutes of latitude (R.G.S. Technical Series No. 4). The curve in the diagram, which is now reproduced for the first time, is drawn to exhibit the length in metres of an arc of one degree of the meridian in different latitudes. It is based upon the Figure of the Earth adopted with all solemnity for international use by the Section of Geodesy in the International Union of Geodesy and Geophysics at their meeting in Madrid in 1924; and whatever



one may think of the process by which this figure was adopted, we may admit that it is good enough for our present purpose.

We see at once that Picard was in fact very nearly right at his first attempt, much more nearly right than the Cassinis in 1720. But we see also that Maupertuis was very wrong. By good fortune his error was in the right direction to prove the flattening, though he very much overdid it. But if we admit that errors of either sign are equally probable we must conclude that he might almost with equal probability have proved the reverse. He was in fact nearly as far wrong in his figures as was Norwood a century earlier. Bouguer and de la Condamine, on the other hand, obtained in Peru a result that was almost

exactly right; and when the Cassinis in 1740 revised their calculations they also came very near to the truth.

But Maupertuis was painted in a splendid costume, flattening a globe with a superb gesture; and the masterly engraving of this picture is esteemed by collectors of eighteenth-century engraved portraits. A good print, though not in the finest state of the plate, was bought for the collection of the Society in 1921.

EDMOND HALLEY AS PHYSICAL GEOGRAPHER

EDMOND HALLEY AS PHYSICAL GEOGRAPHER and the story of his charts. By Professor S. CHAPMAN, F.R.S. (Reprinted from Occasional Notes No. 9, June 1941. Royal Astronomical Society.) $10 \times 6\frac{3}{4}$ *inches;* 15 *pages; maps and charts.* 2*s* 6*d*

HALLEY'S fame as an astronomer, and the want of any adequate biography, have somewhat obscured his contribution to other branches of science, and Professor Chapman has done us good service in putting together this account of Halley as a physical geographer, with reproduction of three of his charts: the first of the Trade Winds and Monsoons, published in the *Philosophical Transactions* for 1686; the second showing the Variation of the Compass in the Atlantic; and the third extending the chart of variation over the Indian Ocean to the Far East, but not across the Pacific. The first has always been easy to find in the series of the *Phil. Trans.*; the second and third were in the last century so little known that Airy in 1870 "had not ascertained that any writer had ever seen it"—he never knew that there were two magnetic charts—and he made inquiries in nearly every academy in Europe before discovering a copy of the third in the British Museum, while the second was first noticed in modern times by Dr. Bauer in 1895. A fourth, the finest of the four, is a New and Correct Chart of the Channel between England and France . . . with y^{e} flowing of the Tydes and setting of the Current, which has escaped the notice of Halley's latest bibliographer, Mr. MacPike, and of Professor Chapman, though it is mentioned in the anonymous Memoir found in the Bodleian Library and printed first in Mr. MacPike's valuable work, 'Correspondence and papers of Edmond Halley,' Oxford, 1932.

At the age of seventeen Halley entered Queen's College, Oxford, but before he was of standing to take his degree embarked for St. Helena in 1676 and came back in two years with the observations for the first catalogue of the southern stars and with an interest in the Trade Winds which led to his making the first meteorological chart, that "shows an excellent appreciation of the value and power of graphical representation of geophysical data on maps" and made him "one of the fathers of physical geography." His own theory of the Trades was not successful, but so great was his fame in later years that the true theory, first given by Hadley in 1735, has been confusedly attributed to him.

In 1700 Halley went to sea again with King William the Third's commission "to be Master and Commander of his Maty. Pink the Paramour" as thus recorded in Admiralty Archives, P.R.O.: a Pink being according to an authority of 1710, quoted in the O.E.D., a vessel whose sides bulge out very much, making her difficult to board; often used for storeships and hospital ships in the fleet. An account of the two voyages made in 1698–1700 was printed in 1773 by