

THE ASCENT OF AMNE MACHIN

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ANOTHER milestone in Chinese mountaineering was passed last year, close on the heels of their ascent of Mount Everest, when a Peking Geological Institute expedition pierced the mysteries of Amne Machin, which had been guarded jealously by its virtually inaccessible topography.

At 13.20 hours Peking time on June 2, 1960, eight climbers of the Institute's expedition stepped on to the summit of Amne Machin, one of the many towering hitherto unclimbed peaks in China.

The significance of our ascent of this peak, which is the main peak of the Amne Machin Mountain, is three-fold:

1. For the first time the main peak was determined to be Amne Machin, not Drandelrungshukh or Shennerig as some had presumed, and its altitude was found to be 7,160 m. (23,491 ft.), which replaces the random guesses of between less than 20,000 and over 30,000 ft.
2. Scientific exploration was conducted and valuable data collected in an area of about 500 sq. km. around the main peak.
3. The calibre of Chinese college alpinists was well demonstrated by this successful first attempt by a purely college expedition in conquering a mountain higher than 7,000 m.

Amne Machin mountain, or Chishih Shan as it is called in Chinese, is a northern branch on the eastern tip of the sprawling Kunlun mountain range. It is located north of the Yellow River.¹ Lying in a north-west, south-east strike in approximately 99° 30' E., 34° 30' N., it is a major mountain in south-east Chinghai Province.

The mountain is marked by extremely complicated features. It is criss-crossed by four glaciers, 4-7 km. long, and numerous wide and deep crevasses on steep slopes. In the vicinity of the main peak, fourteen other snow peaks over 6,000 m. high form what is known locally as the Machi Snow Massif, the highest part of the mountain.

Often referred to in geography as a 'blank spot', Amne Machin defeated a number of attempts by explorers of other countries between

¹ According to the maps we have seen, the Yellow River makes a very acute 'S' bend, and the Amne Machin range lies within the lower bend—T. S. B.

1898 and 1948 to scale its heights.² The American biologist J. F. Rock claimed that the mountain was over 28,000 ft. high. The British traveller General Pereira is reported to have estimated that the mountain lay some 70 miles south-east of the Bulu pass and might prove even higher than Mount Everest.³

Undaunted by the reported difficulties, we teachers and students of the Peking Geological Institute set ourselves the target of conquering the Chishih Shan mountain from the moment our mountaineering team was first formed in 1958.

Towards the end of April 1960 we selected our expedition of ten; eight climbers, a meteorologist and a radio operator. Liu Chao-chang, Ai Shun-feng, Ho Hui-chih and I are assistant professors and Wang Wen-chang, Chou Pin-wei, Wang Hung-pao and Liu Hsueh-shan are students at our institute. The other two are from elsewhere; Chen Chiu-kang, the meteorologist, a student at Peking University, and Li Chin-tsai, our radio man. Twenty-seven-year-old Ai Shun-feng is the oldest among us, and the youngest is twenty-year-old Wang Hung-pao.

A few of us had taken part during the previous two years in the ascent of the 5,215 m. 'July 1' Glacier peak in the Kilien mountain range, the 4,113 m. main peak of the Taipai Shan mountain, and the Lenin peak in the Soviet Union, but none of us had ever climbed above 7,000 m.

We left Peking for Sining, capital of Chinghai Province, at the end of April. There we were joined by another climber, Ting Yuan-tsung, a member of the provincial sports commission.

Our first task was to determine the actual location of Amne Machin's main peak. We could not take for granted the casual assumptions of previous explorers of other countries. More reliable data had to be obtained from the local authorities and people in the area.

On May 8, we left Sining by truck and by evening of the same day arrived in the Hainan Tibetan Autonomous Chou to the north-east of the mountain. Here we met Tsui, the Chairman of the Chou, who is of the local Tibetan nationality. He loaned us a precious locally-drawn topographical sketch of the Chishih Shan mountain, the only available chart of any kind of this untrodden country.

Based on the information we gathered here, it was possible to determine more precisely that the Machi Snow Massif is the highest part of the

² To the best of our knowledge, no attempts had been made by any expeditions to climb Amne Machin: as the author says, in his very first paragraph, the mountain had been virtually inaccessible, and he later calls the territory 'untrodden country'—T. S. B.

³ What these men really said is discussed in *A.J.* 61, p. 221, with notes (8) and (9). It is not in accord with the version here given. Pereira had not, in fact, reached the Bulou pass when he saw the mountain; he guessed at it being 25,000 ft., 'and might be anything'.—T. S. B.



AMNE MACHIN ON THE LEFT. TAKEN FROM ABOUT 5,200 M. TO THE EAST OF THE MOUNTAIN. THE KONGMAR GLACIER APPEARS TO BE THAT ON THE RIGHT, THE WALMAR GLACIER BEHIND AND ON THE LEFT.

mountain. It is situated about 200 km. (125 miles) north of the Bulu pass, not 70 miles south-east of it as claimed by Pereira.⁴

Proceeding in this direction, we arrived in Mashen County in the Kolo Tibetan Autonomous Chou on May 11, where interviews with the local people confirmed our estimates and judgments.

On May 13, we set out on foot from Mashen County for Amne Machin, taking with us local guides and Tibetan language interpreters. Our caravan consisted of 40-odd yaks carrying three tons of altitude equipment, clothing and food. After a six-day trek we arrived at the foot of the mountain massif and there established our Base Camp in a valley 4,950 m. under a glacier descending from the mountain.

The day after our arrival, May 19, a scouting party made up of Liu Chao-chang, Ho Hui-chih, Ai Shun-feng and myself climbed to a 5,120 m. spur to pick out a possible route to the summit.

From our Base Camp, we could see the fifteen snow-capped peaks of

⁴ The account given of the location of Amne Machin is not satisfactory. We have no guidance as to the accuracy of the 'locally-drawn topographical map', but anyone acquainted with the vague notions of topography of peasant people, Tibetan or otherwise, will have their misgivings.

The Survey of India map of *Tibet and Adjacent Countries*, 1917, shows the Polou pass (spelt 'Bulou' in Pereira's *Peking to Lhasa*, p. 118) as south of the Tossun Nor. This last is a regular feature on any modern map of the region; the map in Pereira's volume (W.O. No. 2957, embodying his surveys) is in agreement, as are Mr. Leonard Clark's maps (*The Marching Wind*, pp. 16-17 and 39).

Mr. Chin-hsiao agrees (p. 274) that the Amne Machin range lies approx. $99\frac{1}{2}^{\circ}$ E., $34\frac{1}{2}^{\circ}$ N., the same figures as given in *A.J.* 61, 222. This position lies South-east of the Tossun Nor and a distance of 70 miles would appear to be about right. It is to be remembered that neither General Pereira nor Mr. Leonard Clark was speculating about positions on a map from an armchair; they were writing of where they had actually been. For a considerable distance, they followed, apparently, the same routes from Sining, and are a check upon one another, though they were apt to use different place names at times, which is what one would expect, seeing that Tibetan and Mongol languages had different terms, to say nothing of local appellations.

If Mr. Chin-hsiao's opinion is accepted, that Amne Machin lies 125 miles north of the Bulou pass, this would place it west of Koko Nor, which seems incredible. The alternative is to displace the Bulou pass to a position of about $99\frac{1}{2}^{\circ}$ E., $32\frac{1}{2}^{\circ}$ N.; in that case, General Pereira could not have crossed it (on his way towards Jyekundo), yet, in fact, he *did* cross it.

The whole of this comment by the Chinese looks like an effort to minimise the achievements of earlier explorers. Since Mr. Chin-hsiao has not provided a map, it is impossible to check on his position, beyond the fact that they, like others, started from Sining, and that he agrees with other estimates as to the location of Amne Machin.

It is a great pity that Chinese mountaineers do not set out their reports better; that on Amne Machin is an improvement on the Everest narrative (see *A.J.* 66. 28), however. But we still hear too much about the accuracy of estimates and judgments and the precision of calculations, though the actual data given are usually very vague.—T. S. B.

the Machi Snow Massif, four of which appeared almost equally high. It was difficult, even from the rocky spur right opposite the massif, to determine which of them was the main peak.

We undertook a calculation of the heights of the peaks by the resection method from several base points. After careful comparison and study of the data thus collected, we finally determined that the pyramidal peak shaped like an eagle's beak, rising to 7,160 m. in the centre of the massif, was the main peak. According to local inhabitants, its name is Amne Machin like the name of the mountain itself.

In Tibetan, 'Amne' means 'elder' and 'Machin' means 'Chief Attendant to the Buddha'. The peak has been described by Tibetans of this area as 'the King of Mountains' or 'the Mountain of Gods'. The 'Drandelrungshukh' peak, which Rock claimed to be the highest in the area, is merely a rocky peak less than 6,000 m. high, lying to the north-west, and what he called 'Shennerig' peak does not exist at all.

The exact location of the main peak removed the first major obstacle to the success of our expedition and we went ahead with enhanced confidence. After further study of the results of our reconnaissance work, three provisional routes to the summit were selected.

The first lay across the Kongmar glacier and up along the northern flank of the eastern slope, which was the shortest of the three; the second went up along the Kongmar glacier and then along the South ridge; the third wound along the Walmar glacier and then joined the North-east ridge to the summit.

We worked out a tentative schedule, aiming to complete the whole ascent by early June.

Our first attempt toward opening up a route to the summit was made on the morning of May 20. A scouting group of three, Liu Chao-chang, Ho Hui-chih and I, advanced along the first route up the northern edge of the eastern slope. Meanwhile, Ai Shun-feng, one of our coaches in mountaineering, trained the others in ice- and snow-craft.

After traversing the Kongmar glacier at the foot of the mountain, we came to an ice-fall reposing at an angle of about 40 degrees. After four hours of strenuous clambering up the ice-fall, we reached a pass at about 6,000 m.

We had been hoping to find a possible way up to the summit through this pass. But a sheer precipice of 600-700 m., just beyond the pass, completely blocks the way. To the left, an almost vertical wall soars right to the top of the peak, defying any attempt to negotiate it. So our first march ended here.

After two days of recuperation, we set out again from our Base Camp at dawn on May 23 to explore the possibility of the second route on the south-eastern slopes of the peak. Ho Hui-chih, Wang Wen-chang and I went ahead, and the rest of the expedition, led by Liu Chao-chang,

followed with enough equipment and food to establish an altitude camp. As we went along, we made topographical surveys and investigated and recorded the land features and glaciation. At 5,500 m. the supply group pitched Camp I, while the advance party continued to climb.

It was getting dark by the time we reached 5,800 m. after skirting many breathtaking ice crevasses and crossing numerous hazardous snow bridges. We made some hasty observations and decided that the route beyond was passable and returned to Base Camp the same evening.

On May 26, nine of us started out from Base Camp in an attempt to reach the summit along the second route. We were approaching Camp I around noon when our meteorologist Chen Chiu-kang suddenly developed cramp in his legs and could scarcely move.

We helped him to Camp I and left him there with Liu Hsueh-shan, the assistant leader of the expedition, and Ting Yuan-tsung to look after him, while the rest of us, roped up in two separate parties, continued the ascent. From then on we received rough weather forecasts through signals laid out at Camp I, in the form of figures made up of pieces of coloured cloth.

The higher we climbed, the more rugged grew the topography. The whole mountain side at this stage was nothing but a series of steep ice and snow slopes seamed with open and hidden ice crevasses and ice-falls.

After negotiating a 30-m. high ice slope with a 70° gradient, at about 6,000 m., we found our way blocked by a vertical wall of ice over a dozen metres high. It was now five in the afternoon and we were greatly exhausted, and also thirsty and hungry. But we were determined to get over this obstacle and set up Camp II beyond the ice-wall in preparation for the final assault.

Ai Shun-feng, Ho Hui-chih and I took turns in cutting steps and driving pitons into the ice while the others snatched some rest. It took us a full hour to open a way up. Belayed by the rest of the party, I climbed to the top.

But our day's tremendous exertions proved to have been in vain, for there before me suddenly appeared a deep crevasse 5-6 m. wide, cutting across the whole slope, just beyond the ice cliff. We had not brought the necessary gear, such as rope or metal ladders, for spanning wide crevasses and it was quite impossible to get across.

Someone suggested trying a way round, but on the right, rising like a wall, was a rocky precipice liable to rock and ice avalanches.

We thought of staying the night on the ice slope to see if there was some way out the following day. But it began to snow, making it extremely dangerous to bivouac on the slope, so we decided to turn back to Camp I.

A near accident on our way down almost cost us some of our best climbers. A thin layer of newly-fallen snow had rendered the 70° ice slope just below the ice-wall exceptionally dangerous. Securely

belayed to well-buried ice-axes on the top of the slope, we descended one after another *en rappel*.

Ai Shun-feng, one of our best climbers, who was bringing up the rear, had no anchorage from above when it was his turn to descend. He had to use both ice-axe and crampons, belayed from below. He had hardly moved down a couple of metres when he slipped. With nothing to hold on to, Ai Shun-feng tried to check his fall by turning round, but in vain. Within a few seconds he was 30 m. down the slope and heading for the edge of a precipice.

Instantaneously, Wang Wen-chang and I drove our ice-axes deep into the snow, doubled the rope around their shafts and threw our whole weight on them. There was a terrific pull but the rope held and Ai was stopped at the edge of disaster.

By evening we were back in Camp I and in the morning we returned to Base Camp.

It was May 27. Ten precious days had passed and Amne Machin was still tightly sealed from us in its ancient mystery. Time was getting short. To make things worse, our physical energy was much lower than at the outset and our stock of concentrated foods was also running low.

Yet our determination to overcome the challenging mountain had grown stronger, despite our set-backs and difficulties. We all agreed that we would not abandon our efforts.

That evening, as we rested in our tents and tuned in to Radio Peking, just after 8.30 p.m. the most wonderful news came through. The announcer said: 'Three members of the Chinese Mount Jolmo Lungma Mountaineering Expedition have conquered the highest peak in the world from its difficult Northern slopes.'

We went wild with joy, bumping our heads against the roofs of our tents as we jumped up. Immediately we called a council of war to go over our own plans. We decided to make another attempt, this time from the North-eastern face of the mountain.

We radioed our decision to the State Physical Culture and Sports Commission, the Chinghai Provincial Committee of the Communist Party and our own institute, and from all three received messages of warm encouragement and sincere wishes for our success.

Our morale went up still higher as large quantities of food and equipment began to arrive, sent in by local authorities and the people. The Tibetans who tended our caravan also brought in a good deal of firewood and wild goats which they had hunted.

We were all in higher spirits than at any time since our expedition began and, in addition, had the advantage of acclimatisation. Everyone made proposals on how to tackle the particularly difficult stretches and some very good ideas were presented. Ting Yuan-tsung, Chou Pin-wei, Chen Chiu-Kang, Liu Hsueh-shan and other young climbers

volunteered to carry up heavy loads of food and equipment to facilitate the final assault on the peak.

On May 29th, we moved our Base Camp to 5,000 m., to a spot on the North-eastern face of the mountain.

At this juncture, our meteorologist Chen Chiu-kang reported that the last phase of good weather would only last up to June 2. This meant we had to complete the final march in two days instead of four as we had planned.

We held another meeting to face this situation and decided to set up only one altitude camp, at 6,350 m.⁵ instead of two, at 5,600 and 6,350 m. Consequently, we had to climb a full thousand metres each day as against about 700 m. as previously envisaged.

A glorious, cloudless day dawned on Amne Machin on June 1, the day we had selected for the start of our supreme effort. At 9 a.m. eight of us, Liu Chao-chang, Wang Hung-pao, Wang Wen-chang, Ho Hui-chih, Ai Shun-feng, Chou Pin-wei, Ting Yuan-tsung and I, set out from our new Base Camp.

Stepping on the Walmar glacier leading up the North-eastern side of the mountain, we clamped on our crampons and roped up in groups of four at an interval of a dozen metres.

After leaving behind an ice slope, we entered a large ice-fall area, extending about 800–900 m. Here the whole glacier had broken up into countless ice islands, like a piece of glass hammered into fragments, with innumerable deep crevasses in between.

We wound our way with great caution through this labyrinth of ice, now trudging along the ridges, now worming our way through ice funnels which looked like palaces of crystal.

At about 5,500 m. we came to a deep crevasse, 5–6 m. wide. We searched for a possible way across and finally came to a comparatively narrow part where there was an ice arête about 10 cm. wide lying more than 2 m. away from the edge of the crevasse. Half a metre beyond it was an ice block with a flat top the size of a small table. The only way across was to jump on to the ice arête, step on to the ice block and then jump to the ice island beyond.

This crossing naturally involved risk of slipping and falling into the unfathomable crevasse. But it was the only possible way. The time was already 3.0 p.m. and we were only half-way up to our projected camp site at 6,350 m. We decided to try it at all costs.

Ai Shun-feng, who was now leading, took off his rucksack and volunteered to go first. The rest of us gave him a firm anchorage and he made an excellent leap, but landed a bit too heavily on the narrow ice arête which crumbled slightly under the impact.

⁵ This figure is as received; if the figures are to tally it should, perhaps, be 6,000 m.—EDITOR.

We gasped with suspense, but Ai Shun-feng made a dexterous thrust forward and drove his ice-axe solidly into the ice block beyond, pulling himself over. A route was thus opened for the rest to follow.

Soon after this, a 300 m. 70° slope, with obvious signs of avalanches to its left, rose before us. It was 5 p.m. and strong winds with a driving snowstorm blurred over visibility considerably.

I called a halt to discuss the situation. To proceed through the crevasses, which were comparatively easy to traverse, might cost us precious time. So we decided to attack the ice slope, though it meant taxing our energies and involved great hazards at this stage of the day's climb.

We attacked the slope, virtually crawling forward employing ice-axe and crampon work alternately. The ice had frozen rock-hard, which made step cutting exceedingly arduous. We inched our way up with great caution, for a slip by any one might prove fatal to all the three others roped up in the same party. It took us more than two hours to overcome this perilous 300-m. stretch.

When we had struggled to the top, we found ourselves at the edge of a snow bowl. Waist-deep in the soft powdery snow, we could advance at only snail's pace.

Ai Shun-feng, Ho Hui-chih and I went ahead to open up a track through this 300 m. wide terrain of deep snow. It was hard work, especially with our boots now soaking wet and weighing several extra kilogrammes.

Twelve hours of laborious struggle that day won us 1,350 m. in altitude. We pitched camp at 6,350 m. as planned.

The night before our final assault was tempestuous. The mercury dropped to -25° C. We lit our gas stove to prevent frost-bite and dried our stockings by its flickering flames.

We rose early and found Amne Machin bathed in bright moonlight against a crystal blue sky. The weather had turned fine with only light winds of about 5-6 m. a second. Flocks of white cloud floated lazily over the summit.

The severe cold during the night had frozen our boots hard and it was difficult to get into them and clamp on the crampons. Not before 8.30 a.m. did we set out on the final stretch, again roped up in the same two groups of four.

A climb up a steep slope and across a snow avalanche area brought us to the foot of a huge slope which towered above us about 400 m., right up to the pass just beneath the summit. We laboured up, sinking knee deep in soft snow, halting every few steps to take breath. The sun was powerful and, though protected by sun goggles, we suffered from spells of snow blindness.

Then, after getting over an 80° stretch of shining ice at the top of the

slope, we came into full view of the Amne Machin Peak at a pass about 7,000 m. We were beside ourselves with joy.

We rested briefly, ate a tin of preserved fruit and a few sweets each and resumed our advance in high spirits. I took the lead, carrying our national flag, and our party ascended along the main ridge leading up to the summit. The snow here had compacted into a hard board of ice and it took us one and a half hours to cover the last 160 m., mainly using crampons.

At 13.20 Peking time, we stepped on to the summit of Amne Machin, so filling in this 'blank spot' in Chinese geography.

Excitedly, we hugged each other and shouted at the top of our voices to our hearts' content. We set up three signal flares to mark our victory and posed for snapshots with the national flag, which we then planted on the summit.

I wrote a short message saying: 'For the honour of our Motherland, in the cause of altitude science, we have victoriously climbed this peak.' We all signed it and it was then placed in a metal container and buried in the snow at the highest point of the summit.

We stayed on the summit about 40 minutes, making topographical observations. The summit is the blunt top of a pyramid about 100 sq. m. in area, higher to the east than on the west. The eastern and western faces are sheer precipices that fall directly down to the glaciers hundreds of metres below. Strong aeolian erosion has eaten away the upper part of the eastern face, giving the top of the peak the appearance of an eagle's beak. The main ridge running in a north-west, south-east direction is a razor-edge arête which is particularly narrow on the south-eastern section, perched on sheer slopes. Further surveys by the traverse method on the summit corroborated our previous conclusion that the Amne Machin peak is the main peak of this mountain massif. That same day we returned to Base Camp.

After our ascent of the main peak, we devoted a fortnight's efforts to scientific investigations of the whole Chishih Shan area. We covered about 500 sq. km. to the north, east and south of the Machi Snow Massif.

Our reconnaissance of this area has brought out some of its major geological features, including its geological succession, geological structure and igneous activities. A geological map (scale 1:50,000) of the whole Machi Snow Massif has been made based on our data.

According to fossil evidence, the eastern part of the mountain is composed of Permo-Carboniferous rocks—limestone, phyllite, slate, tuffaceous sandstone and agglomerate; accompanied by batholithic intrusion, basic extrusion and a minor amount of basic intrusion. Signs of mineralisation are indicated by the presence of pyrite and malachite.

From the analysis of the lithofacies, geological structure and igneous

activities, we have provisionally concluded that the area concerned is a young geosyncline.

Our findings contradict the guesses of earlier surveyors that there are no large valley glaciers in this area and the amount of snow and ice here is very small, for we discovered four giant valley glaciers to the north and east of the main peak, 3-7 km. long and 400 m. to 1 km. wide.

To ascertain the heights of the peaks in the massif with the maximum precision, we also conducted further surveys with altimeters and compasses and by the resection and traverse methods. We had checked our meters all the way from Peking to the mountain, and so were able very accurately to determine the altitudes of the dozen and more points from which we carried out our surveys. The height of the main peak, for instance, was obtained by comparing nine very close figures taken from fourteen different survey posts.

We also studied the weather conditions and the glaciation of the past century and collected valuable meteorological and bio-historical data of this area.

We are very happy that we have accomplished something that forms perhaps the most important aspect of modern mountaineering, the combination of climbing with scientific research.

It is exactly with this in mind that all of us at our institute have taken up mountaineering as our number one sport. No less than 97 per cent of the students in our institute have earned the title of 'Alpinist', which is conferred by the State Physical Culture and Sports Commission.

The mastery of the art of mountaineering has stood our students and graduates in good stead in the geological prospecting work they have carried out in more than twenty provinces and autonomous regions during the past two years.

We are by no means complacent about our achievements to date. In our great country, there are many unclimbed mountains yet to be explored and rich hidden resources to be tapped. We aim to go ahead with our mountaineering in the interests of science and socialist construction, to contribute our best to our country's strength and prosperity.