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and currents on the surface and at various depths, as well as the influence of floating and melting masses of ice. Knowledge of the sea is a great and special branch of scientific inquiry, and the methods of conducting it are becoming more and more perfect.

"These researches may be undertaken for their own sakes. Still, they lead to results of great importance, not only with regard to a knowledge of the ocean, but having reference to practical consequences which touch more and more on domestic life. Far-seeing researches in recent years show that the changes in the distribution of ice, and the currents in the sea round Greenland, have an important influence on changes of climate in Germany. The time does not appear to be distant when it will be possible to predict the character of the seasons months beforehand. This is only the beginning of the practical use of these researches. The more scientific use of the seas as fisheries will also be of great importance.

"Here, in an unexpected way, the practical value of polar research shows itself, by opening a wide view of the life-conditions of plants and animals. In former days men carelessly enjoyed the treasures offered to them by this apparently endless scene. Since then there has been great destruction, and now the rational use of the sea has become a problem of importance. Just as agriculture has made great strides in a knowledge of the cultivation of plants, so now we must turn to the sea for supplies.

"The progress made in a short time in this direction is prodigious. Now all the higher and the lower animals are seen to depend on each other, even to the smallest animal organisms, and these, again, need their food. The plankton discoveries show plant-like organisms of microscopic size which flourish on the surface of seas, sometimes in great quantities, while sometimes there is none. The curious fact is that these means of nourishment do not, like land plants, flourish best in the tropics, but, on the contrary, in the coldest polar seas, or where cold currents flow from them. In many places the sea is coloured green from this plant life——"

TRAVEL AND EXPLORATION IN THE SOUTHERN JAPANESE ALPS.*

By the Rev. WALTER WESTON, M.A.

THE islands of the Japanese archipelago—likened by the fertile fancy of native geographers to garlands of flowers festooning those Far Eastern seas—really represent the crest of a stupendous mountain chain that rears itself from the profoundest depth of ocean ever yet

* Read at the Royal Geographical Society, November 6, 1905. Map, p. 128.

fathomed. From the bottom of that portion of the adjacent bed of the Pacific ocean, known as the "Tuscarora deep," to the top of Japan's loftiest peak, the far-famed Fujiyama is an altitude of 40,000 feet. There is probably no other region in the world, of an area so comparatively limited as that including Fujiyama and the Tuscarora basin, that can show such an extraordinary difference of level.

The general characteristics of this gigantic mountain ridge unmistakably prove its close kinship to the mainland of Asia. Japan, at length acclaimed the true pioneer of moral and material progress in the Far East, already, though unobserved, itself occupied a geological position symbolical of it, for its long sinuous island chain forms nothing less than the advanced frontier of the Asiatic continent. The ocean bed between Japan and Korea is so shallow that very slight uplifting of it would be needed to afford dry-land communication between the two.

The mountain ranges of Japan, from their general formation, may be divided into two main systems, the northern and the southern, or the Russian and the Chinese.

The Chinese or southern system is connected with South-East China, and runs north-east by way of Formosa up into the mainland of Japan. The Russian, or northern, is known to Japanese geographers as the Karafuto system. Karafuto is the Japanese name for Saghalien, "Saghalien" itself representing the aboriginal Ainu name *Saharin*, the "wave-land," in allusion to its mountainous character.

The Karafuto system enters Japan from the north, and runs south-west until it meets the southern system in the middle of Japan, which thus becomes, so to speak, the geological battleground of the two conflicting chains, the Russian and the Chinese. It is here, in the broadest part of the main island, that the deepest and wildest valleys are cleft, and the mountains rise to their loftiest heights, in the picturesque summits known as the Japanese Alps.

The conflict or meeting of these two great systems, Russian and Chinese, naturally results in terrific upheavals, and a vast transverse cleft, or fissure, crosses the island at its widest part, through which a number of great volcanoes have burst their way. This fissure is known as the Fossa Magna. It constitutes the geological boundary between northern and southern Japan, whose features present marked contrasts, for whilst northern Japan is comparatively low and open, the southern division, especially its central regions, includes the wildest and most magnificent scenery in the empire.

The chain of erupted peaks in the Fossa Magna forms the Fuji volcanic range, which is of great interest. It stretches from near Naoetsu, on the Sea of Japan, right across the island, and culminates in Fujiyama, then passing out by way of the Hakone hills and the promontory of Izu into the curious island chain known as the "Seven

Islands of Izu." One of its most familiar peaks is the Ōshima island, so often seen smoking away by travellers approaching Yokohama from the west. In a very interesting tour last summer, my wife and I traversed most of the principal peaks of this range on the mainland, some of them being then ascended for the first time by a European lady.

The great mountain range known as the "Japanese Alps" crosses the main island, as I have said, at its widest part; roughly speaking, from the bay of Toyama on the north, to the bay of Suruga on the south. Some years ago I had the honour of reading a paper before this Society on "Exploration in the Japanese Alps," in which I dealt with some six seasons of travel and mountaineering in the northern half of the range. To-night I am to speak of journeys during eight seasons in the southern half, and in the Fuji volcanic chain eastwards. For the sake of clearness, this portion may be called the mountains of Koshu, from the remarkable province in, or on the borders of which, most of the principal peaks are situated.

The mountains of Koshu form an immense triangular mass mainly enclosed by the river Tenryugawa on the west, and the Fujikawa on the east, the apex of the triangle being formed by the famous Lake Suwa. The geographical title of this mass, suggested by Dr. Naumann, is the Akaishi Sphenoid, from the name of one of its loftiest peaks and the wedge-like shape of the whole. The geological formation is chiefly Palæozoic. It is, roughly speaking, formed of three nearly parallel ranges running north and south, the Akaishi on the west, Shirane in the middle, and the serrated granite peaks of Komagatake on the east. I was told that until I ascended the main summits, to which I shall refer, scarcely any of them had been previously visited by European travellers.

The average height of the loftiest peaks is about 10,000 feet, but the character of the scenery, grand though it is, is hardly so wild and rugged as that of the barer, less richly wooded mountains in the northern half of the Japanese Alps, such as Hodakayama and Yarigatake. The nearest and most accessible town of importance is Kofu, on the east, the capital of the province of Koshu, which is connected by rail with Tokyo, six hours distant, the picturesque route leading us through the longest tunnel in Japan, $3\frac{1}{4}$ miles in length, under the Sasago pass. Kofu (population 40,000) is one of the most progressive towns in Japan, and stands in a broad, fertile, mountain-circled plain, once probably the bed of an ancient lake, now dotted all over with thriving villages. It is the centre of a considerable commerce in silk, grapes, and paper. Some of the silk filatures employ several hundred persons, chiefly young girls, whose hours are said to be fifteen per day, without a break for meals or even a Sunday holiday, and this continues all the year round, with the

HODAKA-YAMA, FROM YARIGATAKE.

**SHIRANE SAN, WITH KAIGANE (10,334 ft.), HIGHEST POINT,
ON RIGHT.**

(Taken from hills above Shoji Lake at west foot of Fuji San.)

exception of two months in the winter. Until lately the trade with the coast has been carried on by means of pack-horses over the hills, or by hundreds of boats down the river Fujikawa; but these have been practically replaced by the railway which now joins Tokyo with the fertile regions of Central Japan.

On some of the main roads runs a remarkable and very popular vehicle, known as the *basha*, a cross between an ambulance and a hearse, whose behaviour frequently suggests the probability of its employment in the capacity of one or other of those conveyances. Its repeated use in emergencies was one of those fond delusions to which one sometimes so unaccountably clings (and the *basha* needs energetic clinging to), for its speed only averages $3\frac{1}{4}$ miles an hour, and a day out in it always struck me forcibly as one of the most violent forms of exercise in which a man of robust health and nerve is justified in indulging.

The use of the *basha*, however, can only be enjoyed in the plains and on the more level roads. It must then give way to the pack-horse, from which finally one's baggage is transferred to the backs of sturdy peasants and hunters. These hunters are capable of carrying great loads, which they fix on a wooden frame (similar to those used in the Alps), known as *yasemma*, or "scraggy horse." Some of them were my companions during many expeditions, of which the climb of Kaigane, 10,334 feet, the highest of the Kosshu range and the culminating peak of the central mass, may serve as a specimen of mountain travel in this region. Of this fine peak I made the first ascent (by a foreign traveller) three years ago, repeating the climb last summer. A short day's journey westwards across the Kofu plain took me through a curious natural gateway in the foothills up a beautiful valley, where Ashiyasu lies, 2200 feet, a hamlet of dark scattered chalets that cling with difficulty to the steep and broken slopes and ledges that rise high above a wild torrent bed. Picturesque they are, but it was distance that lent them their chief charm, for their most striking actual features can be neither photographed nor described—their squalor and their odours. One soon ceases in these lower inhabited valleys to be surprised at anything one sees, and at nothing that one smells. All, however, was redeemed by the delightful courtesy of the kindly village headman, Natori Unyichi, the whole resources of whose establishment were put at my disposal, a perfect stranger in a house that had never sheltered a foreigner before, nor heard of a foreigner's strange wants and ways. No sooner had I made known my purpose than he hastened to do all in his power to further it. The way to Kaigane was little known, he said, and very rough and fatiguing, if not perilous, but, if I would be content with the company of a trio of bear-hunters, he would get me the best he could find. These duly arrived, and offered most respectful greetings, though somewhat shy on their first introduction to a *gwai kokujin*, "an outside countries man." They proved delightful companions, willing, thoughtful,

and most eager to please. I met them with interest, and at last parted with genuine regret.

Our first day's journey began with an early start from Ashiyasu, at which the whole strength of the juvenile inhabitants turned out to assist—a motley crowd of jostling, wild-eyed, and incredibly filthy little people.

As we passed the village shrine, my hunters turned aside to offer a prayer for protection and success, exactly as, a dozen years ago, my Swiss guides had done on the way to the Matterhorn.

A fatiguing scramble of five hours in a scorching sun placed us on the top of a ridge, 6500 feet, commanding a fine view towards Fuji, some 30 miles distant, and of part of the upper reaches of the Fujikawa, where it leaves the Kofu plain. Close by grew large quantities of a wild raspberry of enormous size, called *kuma-ichigo*. A rough descent of four hours took us down to the bed of the picturesque Norokawa, one of the torrent-feeders of the Fujikawa, and a still harder struggle of four hours more was needed before we could shelter for the night higher up the valley. Sometimes we had to wade from side to side, up to our waists, in the ice-cold stream, or leap from rock to rock at the side. Occasionally we had to spend half an hour in felling and fixing a tree-trunk, 20 or 30 feet in length, to serve as a bridge. Daylight was dead and the ravine wrapped in darkness long before we could gain our bivouac, and the last hour's work was only accomplished by the faint glimmer of an Alpine lantern, where a slip, unroped as we unavoidably were, would have plunged one into the roaring, swirling torrent with little chance of rescue. Our fourteen hours' scramble at last ended at a spot where, at 5500 feet, in the tangled undergrowth and trees on the left bank of the stream, a dilapidated hut of birch-bark betokened a shelter used by hunters and woodcutters, the sole visitors to this lonely valley. From the low smoke-blackened roof on a tough creeper hung an iron cooking-pot, and this, with a chamois-skin, formed the sole furniture of the hut. However, we spent two comfortable nights under its shelter, the intervening day being occupied by my hunters in fishing, for these streams abound in small trout of half a pound upwards in weight, and a dozen or so are soon taken. On the second morning I started at early dawn with my two strongest men, leaving the oldest of the three to guard the hut and our belongings in our absence. Forging the torrent, here 100 yards in width, we crossed to the right bank and began a rough scramble of six hours up a steep buttress towards the summit of Kaigane, which rose finely above a great ravine known as the O-Kamba. Forcing our way up torrent beds and over the interlacing roots of the *kamba*, or giant birches, or of pines on the lower slopes, we suddenly came upon the rotting, shattered timbers of a little shrine, once built by the father of the friendly headman of Ashiyasu for the worship of the spirit of the mountain. Here used to

TOP OF KAIGANE FROM SOUTHERN ARÊTE.

EAST BUTTRESS OF KAIGANE FROM NORTH.

come parties of hunters, sent as a deputation in times of drought to supplicate the *genius loci* for rain, on behalf of the peasants below. Now, however, an energetic and practical Meteorological Office, and improved methods of irrigation, are influencing them otherwise, and the sacred building, I was told, would never be restored. Beyond the forest came a broad belt of *haimatsu*, or creeping pine; and above this, to the south, towered the bare grey crest of the triangular summit of the mountain. Alpine flowers of every hue, in great variety, adorned the upper slopes.

Especially noticeable were a magnificent deep blue-and-white columbine (*Aquilegia akimensis*) at a height of 9500 feet, and the bright yellow *Potentilla gelida* on the actual summit. This I also found on the highest point of two of the other loftiest peaks in the range—on Ainotake, 10,260 feet, and on Senjodake, 9741. At intervals appeared quantities of the beautiful *Schizocodon soldanelloides*, a near kinsman of the Alpine soldanella, sometimes white, but more frequently a lovely pale claret colour. In the spring-time one finds it as low down as 3000 feet, but on Kaigane and Senjodake I gathered it as high as 9700 feet; varieties of saxifrage, a beautiful yellow violet, *Viola biflora*, *Geum dryadoides*, and many others abounded.

On the top, which commands an extensive and interesting prospect, I found a tiny wooden shrine enclosed in a little cairn, and in front of it a votive offering in the shape of a wooden sword some 10 inches long. Last year, when I made a second ascent of Kaigane by a slightly different route, I found the cairn destroyed and the shrine in fragments, and its place occupied by a surveyor's pole, on which fluttered the tattered remnants of a red-and-white signal flag. Even in these lonely mountain solitudes the finger of scientific progress is leaving its mark, and on every hand is some sign or other that the "old order changeth, giving place to the new."

The next morning early we descended to our hut, greatly to the relief of our old companion left in charge, and many were the kindly greetings and the attentions showered upon me on my return, after five days' absence, to the hospitable headman's home at Ashiyasu.

Of the fine granite peaks that form the east flank of the mountains of Kosshu, the loftiest and most striking is Komagatake, close upon 10,000 feet, along the east base of whose lower foothills the railway from Kofu to Suwa is now being carried.

The summit commands a wonderful view on every side, and embraces all the loftiest peaks in Central Japan—a stretch of nearly 150 miles. It is adorned with the now familiar combination of votive offerings and surveying station side by side, but it would appear that the *genius loci* has still a considerable following, for many of the memorial stones and pilgrims' flags are quite new and substantial. On the occasion of my second ascent to the summit, I traversed the mountain—the first time for a European traveller, I believe—by getting down

on the west side, and so again reaching the headwaters of the Tenryugawa in the neighbouring province of Shinshu. This involved the descent of 5000 feet of very steep and broken granite cliffs, a work of nearly five hours' continuous exertion, and then four hours more were needed before we reached our shelter for the night. At the foot of the last precipice, on which dark pines grew thickly wherever they could find a footing, my hunters turned aside, and led me to a spot, where, on a little shelf of rock, lay the decaying remains of a little shrine. Inside it were a human skull and a few bones, all that was left of a lost chamois-hunter, whose body had been found many years before at the foot of the cliffs we had just descended.

A rich harvest of Alpine flowers awaits the attentions of botanists on this fine mountain also. At a height of 7000 feet most exquisite rhododendrons, of a delicate cream colour, light up the darkness of the silent pines, and occasionally the delicate waxen stem of the "Indian pipe" is seen close by.

The southerly neighbour of Komagatake, Huzan, the "Phoenix" peak, is one of the most striking summits in the granite range. Until last summer it was held to be inaccessible to human foot. Even Dainichi Nyorai, the famous Buddhist saint, is said to have himself returned vanquished, and he had to leave his memorial stone at the foot of the final pinnacle of granite, which rises from a precipitous disintegrating ridge to a height of 9500 feet. To it the comment of a native Japanese geography, speaking of this range, applies with special force: "This is one of the most mountainous regions, and there are in it trackless wilds, for these mountains are almost beyond the ability of human legs to climb."

From the house of my friend the headman of Ashiyasu, a fatiguing climb northwards of eight hours landed us at our bivouac, a ruined woodman's shelter on the south flank of Huzan, high above the valley of the Norokawa, and looking westwards over towards Kaigane. The altitude is 8000 feet, and a crystal spring of icy-cold water rose hard by.

A three hours' climb the next morning led us over the intervening peak of Jizodake, 9700 feet, to a low saddle between it and Hoozan, and close by, at a height of 9000 feet, I found a beautiful dwarf rhododendron, *Schizocodon soldanelloides*, and a lovely orchid (*Cypripedium Yatabeanum*), besides many other Alpine plants amongst the straggling *haimatsu* (creeping-pine) below the ridge. As we passed along the gap, my three hunters were suddenly thrown into a state of wild excitement by the appearance, on a sort of promontory jutting from the gap into a wild ravine on the left, of an *ica-shika*, or chamois. Without a further thought of the main object of our climb, two of them flew off like monkeys to stalk the animal, having only one rifle between them. They were soon lost to view in the ravine, and my

KOMAGATAKE (KOSHU) FROM NEAR SUMMIT OF KAIGANE.

EDGE OF WESTERN LAVA STREAM OF FUJI SAN, NEAR THE
LAKE OF SHOJI.

remaining companion and I were left to finish the ascent as well as we could. The ascent of the final peak I made alone, after several hours of unusually severe exertion, which my companion refused to share. On the descent, shortly after leaving the saddle below Hoozan, we met our truant companions, one of them carrying the carcass of the chamois, which they had successfully stalked in the ravine below. It was a fine buck, about five years old, weighing some 70 lbs. Without ceremony they laid it down, cut it open, and at once invited me to partake of the choicest parts of the internal organs, explaining that this would ensure me a share in the animal's own desirable attributes

HUZAN FROM SOUTH. FIRST ASCENT WAS MADE JULY, 1904.

of speed, agility, and strength. As I was just engaged in a hard-earned lunch of my own, the gruesome invitation proved somewhat untimely, but that night in camp we supped royally. For several days after this, the chief topic of conversation amongst my men invariably had reference to this first ascent of Huzan, thrilling accounts of which, duly embroidered, were from time to time detailed by the only spectator of the climb.

They finally approached me with a somewhat startling request. It was no less than that I should, as the first to succeed on the "Phoenix peak," where the great Dainichi Nyorai had failed, build at its foot a shrine in honour of the divinity of the mountain, and myself become its first *kannushi*, or guardian priest. It struck me as

the most novel offer of preferment, and the most singular proposition for church-building I ever received !

With regard to the summits of the Fuji volcanic chain, I must only speak of them in passing. Of these, Kengamine, the "Sword peak," my wife and I were the first foreigners fortunate enough to succeed in ascending. A curious feature of several of these volcanoes is the loftier and newer cone rising from within an older, lower, and more broken one. Some of the old shattered ridges are extremely steep and narrow, and afford excellent scrambling. On Kengamine, one *mauvais pas* is known as the "Ants' causeway," where a thin crest, some 50 yards long and 2 feet wide, falls nearly sheer on either side for 200 feet or more. It is regarded as a great work of merit to pass safely across, and, after some hours of exertion, to gain the summit. Those who succeed, and have patience enough to spend a night there, are promised at sunrise a vision of Amida riding on a cloud of rainbow hues.

Miyokozan, the northernmost peak of the system, is a good specimen of the double-topped volcano, especially as seen from Akakura, a quaint solfatara hamlet near its foot.

Yatsugatake, the "eight-peaked" mountain, 9784 feet, rises a short distance north of the Kofu plain, and offers one of the most fertile fields for research in Japanese Alpine botany. Mrs. Weston and I crossed it last year from east to west, and spent some days at an interesting *yuba*, or hot spring, 6600 feet, on its east flank. Amongst the flowers specially noticeable is a beautiful black lily (*Fritillaria Kamschatensis*). On the west, at 5500 feet, we found black currants growing wild, this being only the second or third occasion on which I have observed them in the main island of Japan.

Of Fuji itself the fascination never fails, while some fresh feature constantly attracts attention. This I found especially the case during some of my journeys on the Koshu side of the mountain. On the north-west flank a mighty lava-stream once swept down until its course was arrested on the flanks of the hills which hem in the southern part of the Kofu plain. The line of division between the two formations is so distinctly marked that one can step off from the wrinkled lava on to the Tertiary sandstone or conglomerate in a single stride. A chain of lovely lakes, about 3000 feet above sea-level, is formed in some of the deeper hollows of the line of demarcation, and it is said that the level of their waters maintains a constant variation. At the foot of a low hill called Murayama, between the lake of Shoji and the actual north-western foot of Fujiyama, several interesting natural ice-caves have been formed by the moisture which percolates through the porous lava, and freezes in the form of beautiful stalactites and stalagmites of ice. One of these (3500 feet) I explored in the month of May, descending the bell-shaped vertical entrance, some 30 feet in

depth, by the help of a strong rope and the trunk of a pine tree. Our lighted torches disclosed a weird and beautiful scene; but the passage of the cave, nearly 400 yards in length, was a somewhat trying experience, owing to the mixture of broken blocks of lava and bosses of now melting ice over which we had to pick our way.

There are several similar, though less striking, caves in this region, and I have heard that one of them supplies a considerable amount of ice to the neighbouring villages in hot weather.

On the outside of the crater edge, near the highest point, are several cairns and other receptacles for scientific instruments, with which valuable observations are carried on by the staff of the Imperial Meteorological Department. It is odd to see, side by side with these at early dawn, the white-robed pilgrims take their stand to pay their devotions to the rising sun. It presents one of those contrasts that so often seem in rural Japan to make one doubt whether we are living in the tenth or the twentieth century.

A curious instance of this befell me some years ago, when making one of the earliest recorded ascents of Fujiyama while the mountain still wore the snow-mantle that in the spring-time adorns the upper 6000 feet. With my friends, Messrs. Noel Buxton, M.P., and H. W. L. O'Rorke, I called at Omiya, a village at its western foot, to obtain supplies and coolies for the ascent. These were only procured with the greatest difficulty, for we were assured that, as the goddess of the mountain was only "at home," so to speak, to travellers after its formal opening at the end of July, we should surely meet with disaster if we called nearly three months too soon. Oddly enough, no sooner had we reached our bivouac that night, in a broken-down hut in the forest, than a frightful typhoon burst over the mountain, and we were imprisoned there for several days. Ultimately the weather cleared, and we succeeded, in seven hours, in reaching the summit, though all but one of our coolies deserted us at intervals through fatigue or fear. Inspired by the marvellous beauty of the view, which in the early spring far surpasses that at any other season, we decided to descend by a different route, and therefore crossed the mountain to Gotemba, so that our Omiya friends saw us no more. Some days later the native newspapers came out with thrilling accounts of a frightful disaster on Fujiyama, stating that "a party of foreign travellers (supposed to be British, as they alone take pleasure in such risks) had started to ascend the mountain. As, however, a typhoon shortly afterwards broke over it, and nothing has since been heard of them, they have, without doubt, miserably perished."

May I now briefly refer to some other interesting features of this region, and, first of all, to the two chief rivers in whose embrace the great mass is held.

Of these, the Tenryugawa—"the river of the Heavenly Dragon"—

drains the western portion. It rises in the beautiful Lake Suwa, which was once the crater of a gigantic volcano, and whose waters are frozen so hard in winter that heavily laden horses can cross. The lake is about $2\frac{1}{2}$ miles long and nearly 40 feet in depth, but it is said to be slowly filling up. Its neighbourhood is noted for its hot mineral springs, and also for the finest silk produced in Japan.

The Tenryugawa, 150 miles long, flowing at first silently and gently from the lake's western end, gradually gathers strength during a course of 50 miles until at length it cleaves its way through the very axis of a mountain chain, to the Pacific, which it enters near Hamamatsu, on the Tokaido railway, 150 miles west of Yokohama. The river is navigable for boats for nearly the lower 100 miles, and the journey to the sea is of a most exciting character, shooting innumerable rapids and passing through magnificent gorges, with walls towering from 1000 to 2000 feet overhead. Some of the older bridges are very picturesque, but modern contrasts abound.

The Fujikawa, on the eastern side of the Koshu range, carries off the drainage of the mountains encircling the Kofu plain on every side. This plain is said to be the bed of an ancient lake, of which traces still remain. An old local geography (Kai-Koku-shi) states that a famous Buddhist priest, Gyogi, by birth a Korean, in the era Yoro (about 720 A.D.), dug a canal by which the waters of the lake found an outlet in the Fujikawa.

The flooding of these rivers, caused by the melting of the snows at the beginning of summer, and by the heavy rain-storms at its end, leads to repeated inundations, in which considerable destruction of life and property is frequently involved.

The Fujikawa, 100 miles in length, is also navigable for the lower half, from Kajikazawa to Iwabuchi, on the Pacific coast, and though the scenery is less wild and grand, there are features of considerable beauty. Some of the slender bridges of wire and narrow planks are interesting. The more primitive form of these is known as *mannembashi*, "the bridge of 10,000 years," owing to the sensations inspired by the passage of its quaking, swaying length. On the right bank, a few miles from the sea, are some remarkable upright hexagonal columns of andesite.

Although the waterfalls in this region are not numerous, there are several of great beauty, notably the *Shira-ito-no-taki*, or "White Thread cascade," at the west foot of Fujiyama. The stream rushes over the edge of a semicircular basin in the lava, separating into numerous falls of varying breadth, which are regarded respectively as the mother, father, and children, forming one huge family.

On the east side of the range hot springs abound, notably in the neighbourhood of the Fuji volcanic chain, near Lake Suwa and further south. At one of these, Shimobe, a solfatara near the left bank of the Fujikawa, people will sometimes stay in for a month at a time, taking

CRATER OF FUJI SAN. WESTERN SLOPES LEADING INTO CRATER
AT THE ONLY ACCESSIBLE POINT.

IN THE VALLEY OF THE FUJI-KAWA.

the precaution, however, of laying a heavy stone on the knees at bedtime, to guard against turning over while asleep. Both sexes bathe together, and the utmost decorum prevails.

Minerals of various sorts abound, though not usually in great quantities. Gold is found in quartz veins, and also in the river-bed, in the valley of the Hayakawa, a tributary of the Fujikawa. On the fine granite peak of Kimpuzan (8370 feet), which I ascended in the spring of last year, are found opals, copper, and the most magnificent crystals in Japan. One crystal mine employs no less than three hundred persons. Near Toyuka gypsum and alabaster are found, whilst in the Hayakawa valley, again, at Suzuri-jima, a much-prized compact clay slate, used for *suzuri-ishi*, or "ink-stones" (for rubbing Chinese ink), is quarried. Slate for house roofs, though too scarce for general use in Japan, is quarried at Ikawa, a village on the headwaters of the Oigawa.

The Fauna of the region is interesting. A black bear, sometimes as much as 6 feet long, is occasionally killed, and last year two cubs, which, with their dam, had been trapped near Ashiyasu, were offered me for sale. The *iwa-shika*, or Japanese chamois, is quite common. It differs from the Alpine variety in having a bigger head and legs, with shorter horns. A fine mountain deer is hunted in the cold weather, when driven down into the valleys by deep snow and by wolves and other beasts of prey. Its skin in winter is thick and brown, but in summer it is a dappled fawn colour. Boars and wolves are sometimes found, and among the pine forests an ugly red-faced monkey has his home. He is said to be unusually cunning, and to be capable of self-defence by throwing sticks and stones at his pursuers. His fur in winter is exquisitely soft and thick, of a beautiful dark grey, and he chiefly lives on tree-shoots, leaves, and vegetables. Badgers, foxes, and hares which turn white in winter, martens, and tiny beautiful brown squirrels abound, the badgers and foxes especially being greatly feared for their alleged powers of bewitching people. Near Lake Suwa are found wild cats with long tails, quite different from the ordinary tailless or short-tailed varieties elsewhere.

With regard to birds, there is a singular deficiency, though sometimes a splendid golden eagle is seen, and hawks are numerous low down. Occasionally the gorgeous copper pheasant flashes through the pine trees, where also the sweet note of the Japanese nightingale is heard; and absurdly tame ptarmigan, which turn white in winter, are very common among the creeping pine at a height of 8000 or 9000 feet, where they love to feed on the young shoots of the crowberry. It is known as *rai-cho*, or "thunder bird," and is regarded as sacred to the god of thunder. Pictures of it are often hung up as charms of defence against lightning.

The Flora of the region deserves both careful and expert attention, but at present it has received comparatively little.

The commonest forest trees are oaks of several kinds, beeches, birch (of which on Kaigane there is a forest of magnificent size), maples, willows, and various conifers, noticeably *hi-no-ki* (*Chamaecyparis obtusa*), much valued for its useful timber. Higher up grow larches, and beyond them the *haimatsu*, or creeping pine.

A list of some of the Alpine flowers of which I preserved specimens may not be without interest. They were identified for me by Dr. Matsumura, the Professor of Botany in the Imperial University of Tokyo (see Appendix).

There is a remarkable difference in the climatic conditions prevailing in the northern and southern parts of the Japanese Alps respectively. In the former, near the Sea of Japan, the temperature is hotter in summer and colder in winter than in the latter, towards the Pacific.

In the case of the mountains in the northern half, the cold dry north-westerly winds of winter, sweeping across from Siberia, gather up the moisture over the Sea of Japan, and deposit it in a heavy snowfall that often nearly buries whole villages. Houses are then occasionally identified by sign-posts, such as "The Post-office is below," or "The Police Station will be found beneath."

When we come further south, however, except on the higher peaks, there is a marked contrast, especially near the Pacific coast. In place of the snowstorms of the north-west, with their leaden skies and biting winds, the winter weather is there usually bright and sunny, and the snowfall is comparatively slight.

The simple unaffected politeness, and the kindly hospitality one receives almost everywhere, leave the most delightful memories behind. Not only the village headmen, of whom I have spoken, but even the local country police whom one meets on the outskirts of the ranges, are always ready to further one's plans to the best of their powers. One to whom I once applied for information actually volunteered to climb my mountain with me, and proved a most excellent companion. He was very diminutive, but extremely dignified, and imperturbable under all circumstances. Even when, one night in camp, I unluckily rolled out of my hammock and landed somewhat heavily on him as he lay snoring peacefully below, his sole comment was a word of polite apology, "O jama wo itashimashita," i.e. "I am so sorry to have been in your honourable way."

As a rule, the peasant folk are very honest, a feature in which they distinctly excel the ordinary commercial classes in many of the larger, more "civilized" towns. The only robbery I ever suffered was in a strange out-of-the-world hamlet named Narada, in the upper valley of the Hayakawa. The place had only twice before been visited by Europeans, my own expedition two years ago with my friend, Mr. John Kennaway, being the first for eight years. Narada is a wild and

primitive spot, whose inhabitants all bear the same name, Fukasawa, and usually only intermarry among themselves. They looked poorly nurtured, and were dirty and unkempt beyond description, and I noticed that the almost invariable topic of conversation, in the strange and uncouth dialect they spoke with my hunters, was the price of rice, of which they, however, seemed to get very little. My belongings they eyed with intense curiosity, my camera and a pocket-book attracting special attention. The camera was pronounced by the most travelled inhabitant to be a telescope, but the pocket-book they are probably still investigating, for I was relieved of it and its contents during my short halt amongst them, and never saw it again.

Narada boasts of "seven wonders," said to have been bestowed by a princess named Nara-O, who "once upon a time" paid a literally "flying" visit to the Hayakawa valley. These wonders are as follows:—

1. A reed, called *kataha no ashi*, whose leaves grow only on one side of the stem.
2. A pair of crows, whose numbers practically never increase.
3. "*Sentaku-ike*"—a tiny pool whose waters never need the addition of soap for washing purposes.
4. "*Binroji-ike*"—a pond, in the mud of which articles of clothing, if left for a time, are dyed an inky black.
5. "*Shiwo-ike*"—a perennial pool of salt water.
6. "*Go-o-sui*"—"The August Princess's water," a spring especially efficacious in disorders of the stomach.
7. The last and crowning "wonder" of Narada is, that the princess ever went there at all!

My last two expeditions were made during the progress of the late war, and afforded frequent opportunities of observing how the everyday habits and the ordinary institutions of even the commonest peasants all play their part in fitting the Japanese soldier for fighting the battles of his country as few soldiers ever fought. The frugal food and shelter with which he is familiar at home help to prepare him for the hardships and privations of Manchurian campaigns, whilst the climatic conditions, varying as they do from semi-tropical to almost sub-arctic, serve to inure him to all kinds of extremes elsewhere, and he readily adapts himself to his surroundings. The open and communistic character of his daily life—indeed, privacy is almost unknown—tends to render him natural and to develop self-restraint, patience, and resourcefulness. On our expeditions my hunters were never idle, and even on off-days in camp they rarely rested. Nearly all their spare time was spent in fishing, making toys, and playing games, or occasionally writing notes of the journey or what not. They invariably showed great interest in my country, and, for men of little education, asked quite intelligent questions about it. Most of the headmen possess rough maps of their

district, and my companions readily understood the use of those I carried when explained to them. The headman, a sort of village mayor, is a useful factor in the organization of the country-side. Two years ago, when engaged in the work of distributing the relief sent by the foreign residents in Japan and China to alleviate the distress during the Aomori famine in northern Japan, I was brought into close contact with many of them. During the preliminary work of investigation, I found it possible almost at a moment's notice to obtain, through the headman of any given village, the minutest information of the circumstances of any given family. The social organization, so to speak, is most extraordinary all over the country, and the average Japanese possesses the most remarkable aptitude for the mastery of details. On every hand one is reminded that Western civilization has come to a people already possessing, to a high degree, those very capacities and faculties of assimilation that most enable them to adapt for their own purposes whatever they have adopted from the resources of Western peoples.

To what extent they will succeed, however, as *permanent* colonists on the mainland of Asia need not now be discussed. What is certain is that the new fields acquired by Japan on the mainland seem very favourable for the experiment. No less than seven-eighths of the area of Japan is mountain land, and of such a character as to practically preclude the permanent support of a rapidly increasing population. Korea, however, with its hills and forests, its mineral wealth and its fertile plains, has been, as yet, comparatively little exploited, and offers exactly the colonizing ground needed for the overflow of the swelling tide of Japanese life.

APPENDIX.

PLANTS FOUND BY THE REV. W. WESTON IN THE SOUTHERN JAPANESE ALPS.

ON KAIGANE.

<i>Alsine Arctica</i> (Fengl.).	<i>Phyllodoce Pallasiana</i> (Pall.).
<i>Anaphalis Alpicola</i> (Makino).	<i>Potentilla gelida</i> (C. A. May).
<i>Anemone narcissiflora</i> (L.).	<i>Saxifraga bronchialis</i> (L.).
<i>Aquilegia Akitensis</i> (Huth).	<i>S. cernua</i> (L.).
<i>Diapensia Lapponica</i> (L., var. <i>Asiatica</i> , Herd).	<i>Schizocodon soldanelloides</i> (Sieb. et Zucch.).
<i>Draba Nipponica</i> (Maxim).	<i>Sedum rhodiola</i> (DC., var. <i>Tashoioi</i> Fr. et Sav.).
<i>Dryas octopetala</i> (L.).	<i>Stellaria florida</i> (Fisch, var. <i>angustifolia</i> , Maxim).
<i>Geum dryadoides</i> (Sieb. et Zucch.).	
<i>Lychnis stellarioides</i> (Maxim).	
<i>Oxytropis Japonica</i> (Maxim).	
<i>Pedicularis chamissonis</i> (Stev., var. <i>Japonica</i> , Maxim).	

ON SENJOGADAKE.

<i>Aquilegia Buergeriana</i> (Sieb. et Zucch.).	<i>Polygonum viviparum</i> (L.).
<i>Arabis amplexicaulis</i> (Edgew.).	<i>Ranunculus acris</i> (L., var. <i>Stevnie</i> , Regel).
<i>Astragalus frigidus</i> (Bunge).	<i>Rhododendron chrysanthum</i> (Pall).
<i>Campanula dasyantha</i> (M. A. Bieb.).	<i>Saxifraga bronchialis</i> (L.).
<i>Clematis Alpina</i> (Mill).	<i>Schizocodon soldanelloides</i> (Sieb. et Zucch.).
<i>Cypripedium Macranthon</i> (Swartz).	<i>Sedum Senanense</i> (Makino).
<i>C. Yatabeanum</i> (Makino).	<i>Thalictrum aquilegifolium</i> (L.).
<i>Draba Nipponica</i> (Makino).	<i>Thymus serpyllum</i> (L., var. <i>vulgaris</i> , Benth).
<i>Eritrychium pedunculare</i> (A. DC.).	<i>Trautvetteria malmata</i> (Fisch, var. <i>Japonica</i> , Huth).
<i>Euphrasia officinalis</i> (L.).	<i>Trientalis Europæa</i> (L.).
<i>Geranium eriostemon</i> (Fisch).	<i>Trollius patulus</i> (Salisb. var.).
<i>G. Hakusanense</i> (Matsumura).	<i>Vaccinium vitis-idaea</i> (L.).
<i>Geum dryadoides</i> (Sieb. et Zucch.).	<i>Viola biflora</i> (L.).
<i>Hypericum Senanense</i> (Maxim).	
<i>Leontopodium Japonicum</i> (Miq.).	
<i>Pedicularis Keiskei</i> (Fr. et Sav.).	

ON KOMAGATAKE.*

6000-7000 feet.

<i>Arabis lyrata</i> , L.	<i>Pirus aucuparia</i> , Gaertn. (var. <i>Japonica</i> , Maxim).
<i>Astilbe Thunbergii</i> , Miq.	<i>Polypodium Senanense</i> , Maxim.
<i>Cassiope lycopodioides</i> , Don.	<i>Rhododendron rhombeum</i> , Miq.
<i>Cornus Canadensis</i> , L.	<i>Saxifraga cortusæfolia</i> , S. et Z.
<i>Deschampsia plezuosa</i> , Trin.	<i>Schizocodon ilicifolius</i> , Maxim.
<i>Geum Calthæfolium</i> , Menz. (var. <i>dilatatum</i> , Torr. et Gr.).	<i>Solidago Virga aurea</i> , L.
<i>Pedicularis Chamissonis</i> , Stev.	<i>Trientalis Europæa</i> , L.
<i>Phyllodoce taxifolia</i> , Salisb.	<i>Tripetaleia bractata</i> , Maxim.

8500-9500 feet.

<i>Andromeda nana</i> , Maxim.	<i>Diapensia lapponica</i> , L.
<i>Arctous Alpina</i> , Niedz.	<i>Empetrum nigrum</i> , L.
<i>Arnica Alpina</i> , Olin. (var. <i>A. angustifolia</i> , Vahl).	

9500-10,000 feet.

<i>Angelica multisecta</i> , Maxim.	<i>Potentilla gelida</i> , L.
<i>Carex montana</i> , L. (var. <i>Oxyandra</i> , Fr. et Sav.).	<i>Saussurea Tanakæ</i> , Fr. et Sav. (var. <i>phyllolepis</i> , Maxim).
<i>Cerastium schizopetalum</i> , Maxim.	<i>Schizocodon Soldanelloides</i> , L.
<i>Luzula campestris</i> , DC. (var. <i>Multi flora Celanos</i>).	<i>Sedum Rhodiola</i> , DC. (var. <i>Tashiroi</i> , Fr. et Sav.).
<i>Pilea petiolaris</i> , Bl.	<i>Stellaria florida</i> , Fisch (var. <i>angustifolia</i> , Maxim).
<i>P. pumila</i> , A. Gr.	<i>Viola biflora</i> , L.
<i>Pirus aucuparia</i> , Gaertn. (var. <i>Japonica</i> , Maxim).	<i>Vaccinium vitis-idaea</i> , L.

Before the paper, the PRESIDENT said : There is no occasion for me to introduce to you the Rev. Walter Weston. Many of us remember how, eight years ago, we

* Some of these were supplied by my friend Mr. Takeda Hisayoshi.

THE SOUTHERN JAPANESE ALPS

to illustrate the paper by
REV^D WALTER WESTON, M.A.

138

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