

Here, in tropical Queensland, I was much troubled by various borers, and "silver-fish"; but for the latter, which apparently only devour the glaze on paper, and paste, I found a new remedy in adding alum to paste, and keeping glazed writing paper in tin boxes.

For the former a solution of *corrosive sublimate and thymol in alcohol*, appears to be an effectual remedy, though probably it would require to be re-applied from time to time; but certainly all books dressed by me with this solution inside and outside the covers, have never been touched since.

The newspaper extract (paper and date unknown), from which I obtained the information, read as follows:—"Surgeon-General Bidie, in the *Fishing Gazette*, recommends a solution of corrosive sublimate and thymol as a perfect protection for books from the ravages of bookworms and other insect pests, having tested it in tropical countries where the termite and the larvae of innumerable creatures batten upon everything eatable, from door-posts to bottle corks."

I have certainly found this remedy thoroughly efficacious, and think it deserves to be more widely known.

J. EWEN DAVIDSON.

Branscombe, Mackay, Queensland, October 20.

The Properties of Liquid Mixtures.

IN the abstract of my communication to the Physical Society in connection with Mr. R. A. Lehfeldt's paper on the above subject (*NATURE*, December 1, p. 116), the most probable explanation of the fact that, when American petroleum is distilled, the benzene comes over at about 65° instead of 80°, is stated to be that "benzene and hexane behave, as regards distillation, like *miscible liquids*." This should read "*like partially miscible liquids*."

The two liquids are, in fact, miscible in all proportions, and the point is that, in certain respects, they behave as though they were only partially miscible.

SYDNEY YOUNG.

December 6.

The Mildness of the Season.

As an instance of the mildness of the season, I may state that on Sunday, November 27, I gathered five ripe strawberries out of my kitchen garden; and that a considerable number of strawberry plants still show signs of flower. Moreover, the leaves of several deciduous trees, such as peaches, lilacs, &c., which are planted in sheltered situations, are still perfectly green; whilst many others are only just beginning to assume their autumn tints. I have also gathered several rosebuds this morning.

In this part of England all the leaves have usually fallen by the end of November. In fact, in ordinary seasons, the elms (which shed their leaves late) are quite leafless by the middle of the month.

A. B. BASSET.

Fledborough Hall, Holyport, Berks, November 29.

Iridescent Clouds.

THERE was a fine example of clouds showing iridescence on December 4, from 8.50 to 9.5 a.m., in the south-eastern sky. It occurred on a large white cumulo-maculo cloud, the iridescence being confined to the upper and lower margins, which were much striated.

This was at first the same period *after sunrise* as I have commonly observed the phenomenon to occur *before sunset*, i.e. at about an hour's distance from each event (*vide* my letter on the subject, *NATURE*, vol. lviii., p. 390). I have not seen it before in the morning.

E. ARMITAGE.

Dadnor, Herefordshire, December 5.

The Origin of the Aurora Spectrum.

WITH reference to the question as to whether there is any auroral line in the position of the krypton line about 587, the nearest lines to this that have been observed in the aurora appear to be 5765 and 595 observed by Gyllenskiöld. His observations were only rough, but the question is whether they are near enough to the krypton line for either of them to be the same as it. If there is any auroral line about 556, it is likely that the great brilliancy of that at 557 would account for its not having been seen.

T. W. BACKHOUSE.

West Hendon House, Sunderland, November 30.

NO 1519, VOL. 59]

SVEN HEDIN'S "THROUGH ASIA."¹

CAPTAIN FRANK YOUNGHUSBAND prefaced his charming work on Central Asia "In the Heart of a Continent," by a lament that his early education had been wasted on dead languages, so that he started on his travels ignorant of scientific methods of thought or observation (see *NATURE*, June 11, 1896). Dr. Sven Hedin has no such fault to find with his upbringing. Trained in physical geography in the University of Berlin under the great Asiatic traveller Baron von Richthofen, he chose the least-known parts of Asia as a field for exploration, and fitted himself as an explorer by years of preliminary study and Eastern travel. Few men, especially in this country, attracted instinctively to the studies which can make them geographers, have had the opportunity of becoming travellers, although many travellers have been stimulated by their experiences to take up the study of geography. Dr. Hedin writes, as he travelled, like an accomplished geographer. He was no sportsman; and, although a sedulous collector, he was neither botanist, zoologist nor geologist, possessing only that sympathetic general knowledge of natural science which is essential to a geographer, and invaluable to a traveller as a guide to observation. He not only qualified himself in practical astronomy and surveying, so as to collect trustworthy material for maps, but took special pains to master all necessary languages. Besides his native Swedish he was proficient in German, French, Russian and English, and could thus converse easily with every European traveller and official he met; he had already learned Turki, so that in western Central Asia he could question the natives directly, and in the course of the journey he acquired sufficient facility in the use of Mongol and Chinese to enable him to dispense with interpreters.

Being a translation, though a good one, "Through Asia" cannot be compared in style with the best English books of travel; but in substance it is so full, solid and interesting that this is soon forgotten. An awkward phrase, indeed, puzzles one occasionally, such as "diopters" (which may mean the sights for a plane-table); "temporal observations," instead of "observations for time"; and a few others. The word "glen" is very frequently used in a sense which appears to be the same as valley, but may contain some undesigned shade of difference.

King Oscar, whose interest in travel and in all matters Oriental is well known, interested himself in the proposed journey, and assisted in supplying the very modest funds (1900*l.*) required for what has turned out to be one of the cheapest, as well as one of the best, of the great journeys of the century.

Dr. Hedin travelled altogether 14,600 miles, of which 2020 had never before been traversed by a European. He made a continuous map of his route for 6520 miles, which is now being worked up in the great cartographical establishment of Perthes in Gotha, and innumerable observations on the volume of rivers, the depths of lakes and the temperature of air, water and soil, which will all be discussed and published separately. His collections of natural history specimens and archaeological remains will also be made the subject of monographs. Thus although the mass of the scientific data obtained is large, but little of it is considered in this book, which is a compressed narrative of the whole three years' journey, containing, indeed, a fair amount of adventure quietly told, and just enough of the more technical aspect of geography to enable the general reader to understand the explorer's motives and appreciate his results. Enough is stated, however, to show that it is the record of one of the finest scientific journeys ever carried out in trackless Asia.

¹ "Through Asia," by Sven Hedin. With nearly three hundred illustrations from sketches and photographs by the author. Two vols. Pp. xx + 1278. (London: Methuen and Co., 1898.)

Dr. Hedin's work was divided into several expeditions, between which he rested for a few months at a time at Kashgar and other Asiatic cities. The first journey, after driving across the Kirghiz steppe round the north of Lake Aral to Tashkent, was the crossing of the Pamirs in the winter of 1893 by a road traversed in the open season by the Russian garrison of Fort Pamir, and kept open for their mails all the year. The most interesting incident of this journey was the sounding of the great Kara Kul by means of holes cut in the ice. The lake is without outlet and salt, with an area approaching 150 square miles, and the elevation of its surface above sea-level is 13,000 feet; it is completely surrounded by lofty mountains. The lake is divided by a low peninsula into two basins; the eastern, in which three soundings were made, varied from 41 to 63 feet in depth, with a temperature of from $34^{\circ}2$ to $35^{\circ}2$ at the bottom, and the ice was from 3 feet to 3 feet 6 inches thick. The western basin was tested by four soundings, of which the shallowest was 256 feet with a bottom temperature of $35^{\circ}8$, and the deepest 756 feet with a bottom temperature of $38^{\circ}3$. The thickness of the ice here was only from 1 foot 4 inches to 1 foot 9 inches; and the temperature of the air was -20° F. at night. The depth, although considerable, should hardly, however, be called "abysmal," even for a lake.

The second piece of work undertaken was the study of the great snow-clad mountain Mustagh-ata, which is the loftiest summit of the Pamirs, towering to 25,600 feet. Dr. Hedin ascended its slopes to the height of 20,660 feet, where he passed the night. To this elevation he was able to ride on a yak, and bring up his whole camp equipment; so that a trained mountaineer to whom it is a pleasure to climb higher than other people, should here have a good opportunity for making a "record" climb from a comfortable base. Dr. Hedin, however, was not a mountaineer, and defeated in the attempt to climb, he made a careful study of the glaciers all round the mountain. The snow-field of Mustagh-ata measures roughly 10 miles by 6, and from the snow-line valleys radiate in all directions, many of them occupied by great glaciers, the streams from which are collected in rivers on the plain, which flow round the base of the mountain for three-quarters of its circumference before they turn finally to north and south. The work on Mustagh-ata occupied, with occasional intervals, the time from April to October 1894, and during much of this time Dr. Hedin lived amongst the Kirghiz as one of themselves, and obtained a great deal of information as to their customs and mode of life. The winter was spent in Kashgar, where Mr. and Mrs. Littledale happened to be staying at the time, preparing for their great journey across Tibet from north to south.

In February 1895, Dr. Hedin set out on his most adventurous journey, in which he barely escaped with his life, in the desert of Takla-makan. Crossing the Yarkand-daria at 39° E., the desert was crossed in a more or less easterly direction. The party had eight camels, of which only one survived; and the guide with another man, who were believed to have treacherously taken a smaller supply of water than was ordered, perished of thirst in the sand, possibly through being unable to desert so soon as they had planned. Fifteen days were expected to suffice to reach the Khotan-daria, but twenty-six were required. During the greater part of this time the scenery was one monotonous waste of yellow sand dunes, the surface unvaried by a vestige of vegetation, or even by a stone. The largest dunes were as much as 200 feet in height with a crescentic ground plan, and exceedingly steep on the leeward slopes. It was impossible to follow a straight course, and as the intermediate low ground was often occupied by "pools" of the finest sand, in which the camels sunk deeply, it was often necessary to wind over the slopes, following the crests of successive dunes.

No living thing was to be seen. When at last Hedin emerged from the sand, and struck the Khotan-daria, he was alone, on foot, and in rags. By carrying back a supply of water in his boots he saved one of his men; two others with one camel also escaped, and brought some of the instruments and all the note-books; so that what at one time appeared likely to be irretrievable disaster was averted, but narrowly, as he was a week without food. The river was followed northward to Aksu, and Kashgar re-entered on June 21. While waiting for the new instruments, which had been telegraphed for to Europe, Dr. Hedin took another run to the Pamirs, a sort of pleasure trip, for he had the good fortune to share in the festivities of the Anglo-Russian Boundary Commission.

In December 1895 he left Kashgar finally for further explorations in the desert, travelled to Khotan through Yarkand, and along the southern margin of the desert, and collected so much material that he proposes to make another book of it. The *kara-buran*, or black sand-storm, which is common in that region at certain seasons, seems to be similar to the American tornado. This type of storm occurs only in summer, and almost always in the afternoon, rarely lasts above an hour, comes more frequently from the west than from the east, and is so furious in its intensity as to sweep sheep away bodily. Another strip of the desert was crossed from the Khotan-daria to the Keriya-daria, a river never before visited by a European; and on the way Dr. Hedin discovered the ruins of an ancient city, called Takla-makan, built of wood, and full of relics of an ancient time, when the prevailing religion was Buddhism. The curious appearance of the ruins as they project from the sea of dunes is well brought out in the illustration on the next page. These dunes have a uniform angle of 33° with the horizon on the steep leeward slope, while the windward slope varies from 20° to as little as 1° ; a calculation gave about 160 feet per annum as their average rate of advance. The grassy borders of the Keriya-daria were found inhabited by a race of shy shepherds, who rarely visit a town, and had never seen a European before. The desert margins abounded in wild camels, several of which were shot. From all Dr. Hedin could see and hear of them he was convinced that they are descendants of the tame camel, their present wild life being a reversion to nature, not a primitive state.

Proceeding northwards, the Tarim river was crossed on the ice in February; this river, in the latitude of Naples, is said to remain frozen for three months of the year, a good example of the effect of continental climate, although the atmosphere is too dry to furnish any snowfall.

The Lop-nor region was made the object of careful study, and geographically this is one of the most interesting parts of the whole book. A controversy as to the character of Lop-nor has been going on for many years. The great Russian explorer Przhevalsky explored a lake which he held to be the ancient Lop-nor; but it was fresh, yet without outlet, which proves that it must be of very recent formation. Richthofen pointed out that the ancient Lop-nor, placed by Chinese geographers a degree further north, must be salt if it still exists; but Hedin discovered that there is a very recent lake which he believes reoccupies the western part of the bed of the old Lop-nor, which has been nearly filled up by desert sand. The whole region is almost at the same level, and the lakes are so thickly overgrown with huge reeds, that it is very difficult to trace the boundaries of the shallow sheets of water, which evidently shift in position from time to time as the rivers of the desert also do. The Lop-men are very expert canoists; but the translation is obviously in error in speaking of them as "rowing" the long narrow canoes with "oars," which would be impossible without outriggers; the illustrations show them paddling by means of paddles, a very different method of propulsion.

The last piece of exploration recorded in the book has

redeemed a long strip of the map of Tibet along the parallel of 36° N. from absolute blankness. Leaving Khotan with a large caravan of horses, donkeys and camels in June 1896, Dr. Hedin proceeded eastward, skirting the desert to Kopa, then turning south-west into unknown country across the west end of the Altyn-tagh, he crossed the parallel range of the Arka-tagh (close to the place where Littledale crossed it going south), and marched eastward for twenty-six days along a great elevated region averaging nearly 16,000 feet in height, with the Arka-tagh bordering it to the north, and another snowy range, the Kokoshili, to the south. This is spoken of as a "latitudinal valley," or as a valley bordered by "latitudinal mountain ranges," but the sense of the term is not clear, the expression *longitudinal valley* would appear to be the correct one, as it seems to be a vast trough between parallel mountain ridges. The centre of the

xxii. and xxiii., said in the text to be the longest day's journey, is represented as very nearly the shortest, and the position assigned to the camps does not fit the description. At length, on October 1, 1896, Mongols were met, and a descent made from the Tibet plateau to the Tsaidam swamps, whence the route lay over known ground to Peking, and thence Dr. Hedin returned to Sweden across Mongolia, Siberia and Russia.

When one contemplates such a journey, so brightly and popularly told, full of adventure, hardships and solitude, yet every hour of it occupied in collecting, observing, note-taking and map-making, and when one remembers that only German training can make such work possible at present, even to the most adventurous and persevering traveller, it is impossible not to be struck from another side by Sir John Murray's feeling, expressed in his recent appeal for Antarctic exploration:—

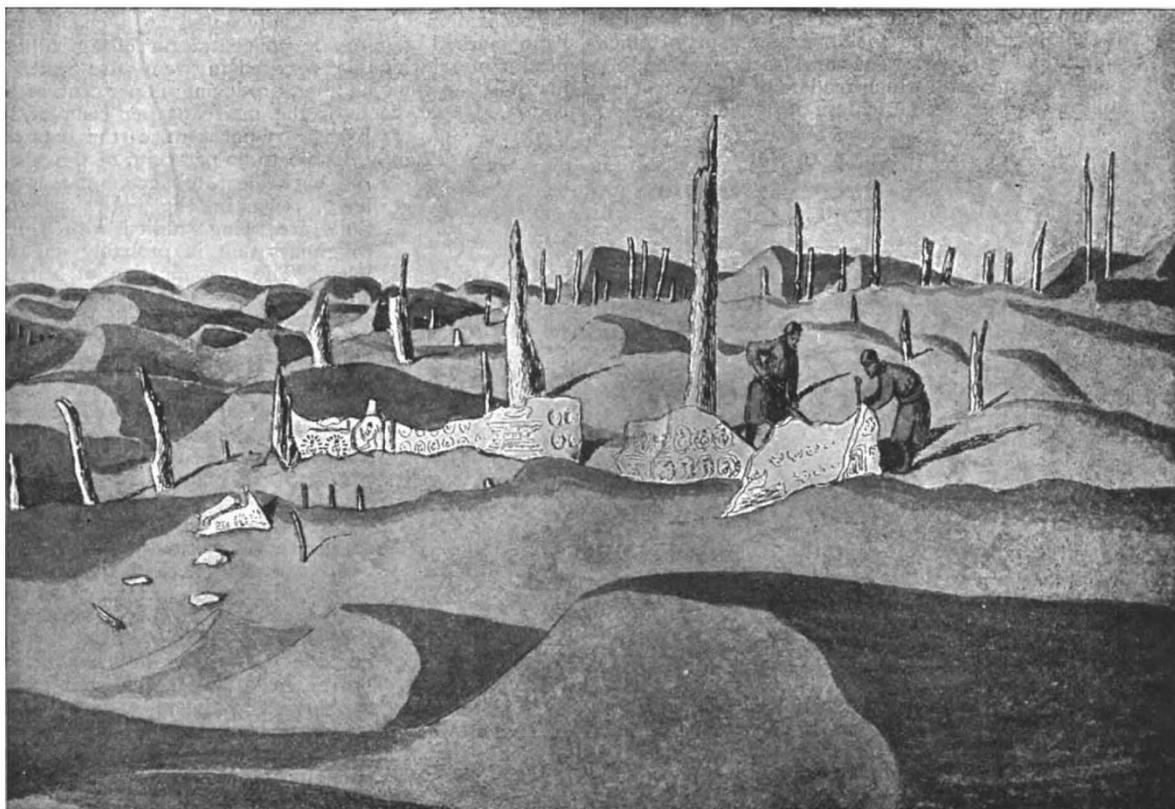


FIG. 1.—The ruins of Takla-makan east of the Keriya-daria.

trough is occupied by a succession of small basins, each an independent centre of drainage, and each containing a long narrow salt lake lying east and west. It is really a land-surface in the making. If the precipitation had been heavy enough to fill these basins and start rivers flowing from one to another, the whole valley would now be drained by a great axial river; but in default of river erosion the basins remain untapped, and wind and frost alone are fashioning their peculiar topography. A little yellow grass was found in patches in the basins, on which vast herds of wild asses and wild yaks were feeding; but for fifty-five days no human being or human habitation was seen. We look forward with much interest to the detailed description of this interesting region, the map of which, prepared in Sweden, is obviously only provisional, and not accurate; for instance, the distance between camps

"The conviction that we are, in exploration and scientific research, not doing anything like our best, is much deepened when we compare our present efforts with what is being done in these directions by other progressive nations." HUGH ROBERT MILL.

THE AMERICAN AGRICULTURAL YEAR-BOOK.¹

YEAR by year the official volume issued by the Department of Agriculture at Washington appears to increase in interest and importance, and the latest addition to the series is well-nigh bewildering in the

¹ "Year-book of the United States Department of Agriculture," 1897. Pp. 492; with 40 plain or coloured plates, and 45 figures in the text. (Washington: Government Printing Office, 1898.)