

THURSDAY, NOVEMBER 28, 1889.

MR. STANLEY.

M R. STANLEY'S latest letters, which have been exciting universal attention, present as fascinating a record of travel, adventure, and geographical discovery as any that has ever awakened the interest of civilized mankind. It is impossible to read them without the warmest admiration for the writer's resolute energy, inexhaustible resource, and dauntless courage. No previous traveller can have been confronted by a greater number of formidable—often apparently insurmountable—difficulties. Mr. Stanley never allowed himself to be disheartened by the obstacles in his way, but pressed steadily on, varying his methods to meet changing needs, until the immediate object of his great enterprise was attained. Not the least serious of his perplexities sprang from the reluctance of Emin Pasha to be "rescued." It was not unnatural that Emin should hesitate to quit a region for which he had made so many sacrifices, and with regard to which he had entertained so many hopes; but it is certain that if he had remained he would soon have fallen a victim to treachery. Happily, Mr. Stanley, after many an argument, succeeded at last in overcoming his scruples and hesitations, and on April 10 the two men, accompanied by a party of about 1500 persons, including native carriers, started from the southern shore of Albert Nyanza on their homeward journey. No part of Mr. Stanley's narrative is more interesting than that in which he tells the story of his efforts to persuade Emin that he might with honour resign a task which had already been practically taken out of his hands. The tale brings out vividly a most striking contrast between two types of character, each of which in its own way commands our sympathy and respect.

The scientific results of Mr. Stanley's journey are full of interest, and form a most important addition to our knowledge of Central Africa. On April 11 (NATURE, vol. xxxix. p. 560) we gave an account of his geographical discoveries so far as they were then known; and anyone who will consult the map which we printed on that occasion will be able to trace without difficulty the main lines of the explorer's later course. In 1877 Mr. Stanley discovered Muta Nzige, which he now calls Lake Albert Edward. This lake is less extensive than was originally supposed. At the time of its discovery it could not be determined whether its waters were discharged into the Nile or the Congo, but now Mr. Stanley has found that it is one of the feeders of the former river. It receives all the streams of the south-western part of the Nile basin, just as Victoria Nyanza receives all the streams of the south-eastern part of the Nile basin. The two lakes discharge their waters into Albert Nyanza, whence flows the White Nile. Lake Albert Edward and Albert Nyanza are connected by a river called the Semliki, whose valley Mr. Stanley vividly describes.

Lake Albert Edward occupies the south-western end of a great area of depression, at the north-eastern end of which lies Albert Nyanza. This area of depression lies between 3° N. lat. and 1° S. lat., and is from 20 to 50

miles broad. East and west of it rise extensive uplands, those on the western side forming the water-parting between the Nile and the Congo. Towards the east, beyond the valley of the Semliki—that is, the central part of the line of subsidence—is a great mountain range called Ruwenzori, "the Mountains of the Moon," culminating in peaks which Mr. Stanley estimates to be between 18,000 and 19,000 feet. Past this splendid range the party advanced on their way southwards. Says Mr. Stanley:—"Much as we had flattered ourselves that we should see marvellous scenery, the Snow Mountain was very coy, and hard to see. On most days it loomed impending over us like a tropical storm-cloud ready to dissolve in rain and ruin on us. Near sunset a peak or two here, a crest there, a ridge beyond, white with snow, shot into view, jagged clouds whirling and eddying round them, and then the darkness of night. Often at sunrise, too, Ruwenzori would appear fresh, clean, brightly pure; profound blue voids above and around it; every line and dent, knoll, and turret-like crag deeply marked and clearly visible; but presently all would be buried under mass upon mass of mist until the immense mountain was no more visible than if we were thousands of miles away. And then, also, the Snow Mountain, being set deeply in the range, the nearer we approached the base of the range, the less we saw of it, for higher ridges obtruded themselves and barred the view. Still we have obtained three remarkable views—one from the Nyanza Plain, another from Kavallis, and a third from the South Point."

Lieutenant Stairs tried hard to reach the loftiest summit, but succeeded only in attaining a height of 10,600 feet, which was separated from the snow-covered peaks by deep ravines. He is of opinion that the central mass of the Ruwenzori range is an extinct volcano, and that certain jutting pinnacles on the sides of the mountains are survivals of the time when volcanic forces were in full activity. So much of the débris is borne along by the Semliki that the southern part of Albert Nyanza is being rapidly filled up.

Mr. Stanley has much that is new to tell us, not only about Albert Nyanza and Lake Albert Edward, but about Victoria Nyanza, a great south-western extension of which he has discovered. About the many tribes through whose territories he passed he has also a vast amount of curious and suggestive information, offered with all the freshness due to his immediate contact with the facts he describes. Nothing could be better in its way than his account of the Wakonju, a tribe from whom he and his people received much kindness. They occupy the slopes of the Ruwenzori Mountains, on which some of their villages are built at a height of 8000 feet. Here they have taken refuge from their enemies the Warasura. It is noteworthy that in many parts of the Central African uplands which he visited Mr. Stanley found a physical type which he identified with that of the Abyssinians. On these and many other points of interest the world may expect soon to receive from him further enlightenment. Meanwhile, we desire to join most cordially in the expressions of high appreciation that have been everywhere evoked by his success, and by the great qualities of intellect and character by which it has been achieved. Such geogra-

physical labours as his are unsurpassed in hardship, and the results obtained make his work one of the most important and fruitful researches of the time.

THE HABITS OF THE SALMON.

The Habits of the Salmon. By John P. Traherne. (London : Chapman and Hall, 1889.)

THE Stormontfield breeding ponds have taught us much of the history of the salmon from the eggs to the smolt stage. After that he passes to the sea, beyond the reach of observation, and, with the exception of what we have learned from the return to the rivers of fish that have been marked before their passage to the sea, all that purports to be knowledge of the habits of the fish is really only guesses at truth.

Theories by a practical salmon-fisher, of wide experience, are entitled to respectful examination. This Major Traherne can claim ; more than that he does not claim. The arrangement of the chapters in the book is objectionable as tending to confusion. It would be preferable to take first the chapter on smolts, and then to follow the life of the fish through its grilse, salmon, and kelt stages.

Notwithstanding that "smolts bred in the Stormontfield, Howietown, and other fish ponds have never as yet been known to evince the least desire to go to sea before the spring months," yet Major Traherne is of opinion, and supports his opinion with good evidence, that there is a double emigration of smolts—autumn as well as spring. Smolts that are bred artificially are always the produce of ova spawned in November, and these form the spring migration. It is assumed that the later spawned ova form the autumn migration. If this be so, it may explain the mystery of the spring and summer run of fish. It is proved that smolts leaving Stormontfield ponds in the spring have returned to the river as grilses in July of the same year, having increased in weight from 3 to 9 pounds each, the grilse caught on July 1 weighing 3 pounds, and that caught on July 31 weighing $\frac{9}{2}$ pounds. The smolt would probably weigh about 2 ounces, and the rapidity of growth, without any expense for feeding, should make those who have charge of salmon legislation ponder over the problem of close time.

What, then, becomes of the autumn emigration of smolts? Do they come back as spring salmon? The first run of spring salmon, like the first run of grilse, is small in size. From 8 to 10 pounds would be the average weight of the first run of spring fish. The spring smolt takes three months to return a grilse ; the autumn smolt would have five months to return a spring salmon.

We quite agree with Major Traherne that spring fish stay in the rivers to spawn. We also think, from the appearance of the fish, that the early, small spring fish are maiden fish that have never spawned. Are they not the autumn smolts?

But all rivers do not have a run of spring fish. Major Traherne says : "I notice that early ascending salmon are far more numerous in rivers that have an annual close

time commencing on or before September 1, than in rivers where the close time commences after that date." This is simply a confusion of cause and effect. It is the early river that causes the early close time, not the early close time that causes the early river. What causes a river to be early ? or, in other words, what causes spring fish to run up one river, and not to run up another ? Major Traherne replies, the temperature of the river. He contrasts the early arrival of salmon in Loch Naver with their late arrival, by way of the Thurso, in Loch More, and he says that the River Naver, being fed by a large, deep loch, is warmer than the Thurso, which runs from a small shallow loch ; therefore the earlier run of fish into Loch Naver ! But the fish run as early up the Thurso River as they do up the Naver River ; so this illustration fails. He afterwards refers to the Shin, the Cassley, and the Oykel, all of which rivers empty themselves into the Kyle of Sutherland. He says that the temperature of the water in the Shin—a river flowing from a very large lake—is higher than the temperature of the Cassley, or the Oykel, which are not fed by big lakes ; and that this is the reason why the Shin is the only river, running into the Kyle of Sutherland, which produces early salmon. We reply by denying the premise. The Shin may be a rather better early salmon river than the Oykel, but it is not an earlier river. The opening day always finds clean fish in the Oykel, and, this year, from one bank, the Oykel yielded thirteen fish in March. Last year the yield of one bank of the Oykel in April was twenty-three fish ; both banks of the Shin yielding thirty fish. Twenty fish in March would be a good yield for the Shin.

But to come back to the question, What causes a river to be early ? Certainly it is not the absolute temperature of the river. On the north and east of Scotland the rivers are early, on the west coast they are late. The temperature of the rivers on the west is higher than that of the rivers on the north and east. Contrast the rivers Oykel and Inver. The former rises in the eastern slopes of Ben More in Assynt, and is fed in March and April by the melted snows. It has not any big lock as a reservoir, and in March is often frozen over. The Inver runs out of Loch Assynt at the western foot of Ben More. Little snow lies on the western side of the hill, and Loch Assynt is large and deep. The water of the Inver is higher in temperature than the water of the Oykel. The rivers lie opposite to one another in Sutherlandshire ; the Oykel, icy cold in the spring, running east ; the Inver, much warmer, running west. The cold river is an early river ; the warm river is late. Major Traherne is therefore wrong when he says that the high temperature of a river makes it early. We say that the relative temperature of the river to the sea into which it empties itself determines the run of the salmon. If the temperature of the river closely approximates to the temperature of the sea the fish will run, no matter how cold both river and sea may be. On the west coast the sea is so warmed by the Gulf Stream that the rivers on that coast, although positively warmer than on the east coast, are, relatively to the sea, colder, and they are accordingly late rivers.

The relative temperature of the air and the water has a great effect, too, upon the feeding of the salmon. Major Traherne says : "I never expect to meet with a