

THE UPPER NILE.

Big Schemes of River Improvement Which Cost Millions.

(Special Correspondence of the Deseret News by Frank G. Carpenter.)

Khartoum.—I want to tell you about some gigantic projects which the English are considering for the upper Nile. That mighty stream has now its whole course through British territory. It flows in Lake Victoria, in the British province of Uganda, and flows through that province into the Anglo-Egyptian Sudan. It winds its way through the Sudan, traversing the old land of Nubia, and then goes on down through Egypt, which is practically a dependency of Great Britain, to the Mediterranean sea. From its source to its mouth it flows through about 30 degrees of latitude, and its course has a length of more than 4,000 miles. The British control not only the main stream, but most of its tributaries, and thus own the great lakes of Victoria and Albert Nyanza, as far as the Nile outlet is concerned. The only other outlet which has anything to do with the stream is the Atbara, in whose highlands the Blue Nile and Atbara have their sources. The control of these two rivers is, moreover, so regulated by treaties that they cannot be touched except by British consent, so that the Nile may be called an English river and may be looked upon as in the hands of one of the richest, most able and most successful of the developing nations of the globe.

I have already told you of the improvements that the British have made as to the Egyptian course of this great waterway. For a month and more I have been traveling along that part of it. I have visited the great canals of the delta, and also the Barrages at Cairo and Assiut. I have written you of the huge dam at Assiut, which has been built at a cost of \$22,000,000, to give the Nile a steady water supply. This dam has made a reservoir 140 miles long, and it now holds back 1,000,000,000 tons of water to feed the Nile, when low. It is now to be raised 20 feet higher, and it will then hold back almost as much more. It has already added millions to the wealth of the lower Nile valley, and it has made the Egyptians one of the most prosperous peoples on the globe.

BIG PROJECTS OF UPPER NILE.

The projects which the British are now considering are more important than anything they have done in the past, and they will rank as the most daring of the engineering plans of the century. If carried out they will cost as much as it did to build the Suez canal, but they will assure the greater Egypt a steady water supply all the year round for all time to come, and they will build up here, at a distance of 1,500 or 2,000 miles south of the Mediterranean sea, several other Egyptias twice or three as rich as the lower Nile valley, each supporting its millions of people.

The projects embrace the regulation of the great lakes on the highlands of central Africa, so that they may serve as reservoirs for the Nile. They include the embankment of those tributaries of the White Nile which flow through the great swamps on the northern slope of the Kongo watershed, and also the digging of more than 200 miles of new channel, by which the main stream of the White Nile will be greatly shortened and its flow increased, carrying the enormous volume of its waters unobstructed down to Khartoum. Another scheme contemplates the damming of the Atbara, so that it will irrigate large tracts in Upper Nubia, and still another the erection of a dam at Lake Tsana, on the highlands of Abyssinia, which will make that great lake a reservoir for the Blue Nile, and enable it to water the fertile plain

which lies between the Blue and White Niles, ending here at Khartoum.

MORE WATER NEEDED.

The great trouble now is that a large part of the waters of the Nile go to waste. It is in use the fourth river of the globe, ranking after the Amazon, the Kongo and the Rio de la Plata in both and rainfall. The area it drains is more than one-third as large as either Europe or the United States, and so much water falls that if it could be collected together it would more than fill a ditch a mile wide and a mile deep reaching from New York to Chicago. The river is fed by mighty lakes, one of which is the largest on earth. Victoria Nyanza is bigger than Lake Superior. Lake Albert is about the size of the Great Salt Lake and Lake Tsana has an area of 1,200 square miles. Notwithstanding this, the windings of the Nile are such that more than one-half of the water supply does not get to the lands that need it, and during the summer there is only about enough saved to accommodate Egypt. At the time of the floods, which occur every year, vast quantities of water go to waste, and all the year round there is an enormous loss going on by the evaporation from the swamps of the upper Nile.

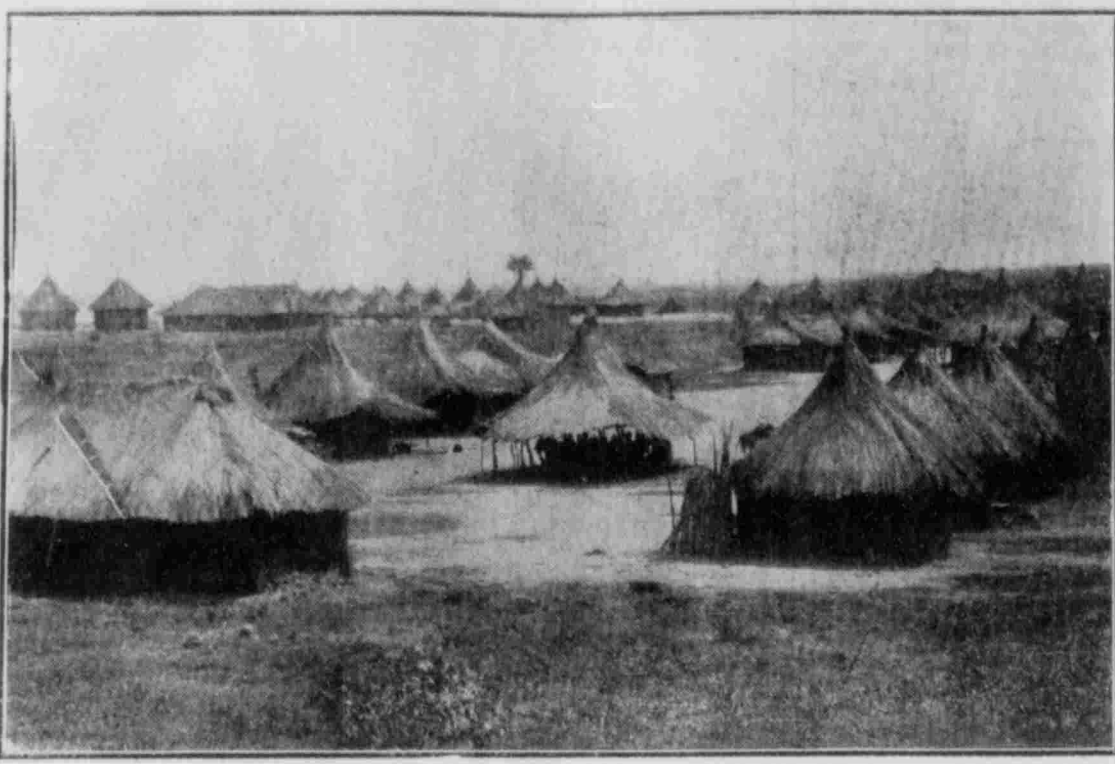
A SPONGE AS BIG AS INDIANA.

I despair of giving you an adequate idea of these mighty swamps. They lie on the northern slope of the Kongo watershed and are fed by the great branches of the White Nile known as the Bahr el Jebel, the Bahr el Ghazal and the Bahr el Zeraf. They begin where the river Sobat flows into the Nile, and form an irregular triangle, the base running from there 200 miles westward and with the southern apex at Bor, which is two or three hundred miles farther south. They lie on the bed of what in prehistoric times was a great lake, and they are composed of masses of reeds, papyrus and other aquatic grasses. These are so united that they soak up the water like a mighty sponge. Now if you will imagine a sponge as big as the state of Indiana, from two to six feet in thickness, and so situated that it is always filled by the waters of the Nile, you may have some idea of this region. The place where the sponge lies is not far from the equator, and the tropical sun beats down upon it, so that a steam is always rising. It soaks up the waters of the Nile and gives them out into the air. The evaporation is so great that an amount equal to half the capacity of the Assiut reservoir is lost every day, and in the summer fully 50 per cent of the water supplied by the great lakes does not get into the main stream of the Nile. The water of this swamp is moreover much over a mile's head, and in most places except where the main streams flow through, it is only about as deep as his waist. The evaporation increases at the time of the floods, when more land is covered, and no matter how much water flows into the swamp, only about the same amount flows out. This is so throughout the year.

THE SUDD.

This vast region is known as the Sudd. It is now being explored, and attempts have been made to cut channels through it. I have met some of the surveyors who have attempted to penetrate it, and some who have broken away parts of it to open up channels for the Nile. They describe it as a vast sheet of brilliant green made up of papyrus, feathery reeds and sword grass. These rise from five to 15 feet above the water and are broken here and there by patches of ambatch trees and by channels, pools and lagoons. The greater part of it has no human inhabitants, and this is especially so of the region along the Bahr el Ghazal.

How John Bull Proposes to Dam Lake Victoria and Canalize the White Nile—Albert Nyanza as a Storage Reservoir—Draining the Sudd—A Sponge As Big as Indiana, Which Eats Up Half the Nile Waters—The Blue Nile And a Dam for Its Source in Lake Tsana—How the Atbara May be Controlled—The British Making the Nile a New River and a Possible Trade Route to the Congo.



LADO, NEAR GONDOKARA, 3,000 MILES UP THE NILE.

Photographed for the "News" by Frank G. Carpenter.

There are some Dinka villages near Bor and a few tribes on the edge of the Belgian Kongo. Further south at Lado and Gondokoro the region is populated.

It is only at the south of the swamp region that big game is to be seen. There the land is a little higher, and elephants, giraffes and buffaloes inhabit the edges of the swamps. In the heart of it, and, in fact, in all parts of it, there are vast numbers of hipopotami, and there are all sorts of swamp birds everywhere. From the reeds and mud banks clouds of wild cranes, geese, storks, herons, pelicans and ducks of every description rise up as the boats approach, and there are insects by millions. There are all sorts of mosquitoes, moths, spiders and flies, and there are other insects which carry fevers and the tsetse fly, which causes the sleeping sickness. Among the queer birds is the whale-headed stork, one of which may be seen here in the palace grounds at Khartoum. The wild geese are black, white and brown.

It is impossible to conceive how closely the vegetation of the Sudd is matted together. The roots of some of the plants go down into the beds of the swamps, others float on the water and the whole is one great undisturbed mass. Sometimes a section goes loose and becomes a floating island until it reaches a shallow place, where the roots will

grow fast again. Such islands often block up the channels of the river, and some of the main tributaries have so much vegetation that it is impossible for a boat to make its way through them.

OPENING UP THE TRIBUTARIES.

Nevertheless, one of the projects contemplates the opening up of these tributaries of the Nile. It is believed that the Bahr el Zeraf could be banked up so that it would carry the volume of the Nile and keep it out of the swamps, and thus save the enormous amount of water wasted by evaporation. The river would have to be banked up between Bor and Lake No, and in that case it would probably carry the Nile's summer water supply. The Bahr el Jebel will also be opened up for navigation, and by so doing or other a great part of the river will be held in its course. These schemes would mean an expenditure of millions of dollars. I think the estimate is about 18 millions.

SHORTENING THE NILE.

Another project, which seems to be more feasible, is the digging of a canal on the Nile, beginning at Bor and running south across to where the Sobat river flows in. Such a canal would carry the waters of the Nile along on the highlands above the swamps and

prevent their flowing into them except when desired. This canal would need to be a little over 200 miles long, and it could be controlled at Bor by a regular across the stream, by which as much or as little of the Nile as is needed can be sent down the river. The channel proposed would carry about 1,000 tons of water per second, which is only one-fifth more than the amount discharged into the big canal at Assiut. This Bor-Sobat canal would shorten the main Nile as a navigable waterway, and all the boats going up and down the stream would pass through it. The excavation would cost about \$22,000,000 and the regulation works \$5,000,000 more.

DAMMING THE GREAT LAKES.

With this part of the Nile channel so improved by means of regulators at Lake Albert and Lake Victoria where the Nile flows out, the supply of water for Egypt and a part of the Sudan would be unlimited. Lake Victoria would furnish an inexhaustible reservoir, and I understand that the proper works could be put in at Ripon falls at no very great expense. A dam there would mean the storage of 70,000,000,000 tons of water for every meter's rise of the lake. The Assiut dam, as it is now built, stores only 1,000,000,000 tons, and when it is raised according to the new plans now being carried out it will

store only 2,000,000,000 tons. Raising the surface of Lake Victoria a little over a yard will store 35 times as much in addition to its present enormous contents.

There is one obstacle, however, to such an undertaking. The rising of the lake might flood parts of German East Africa, and if so, the water would probably be lost. Dams at the mouth of Lake Albert would result in the storage of 5,000,000,000 tons for every meter of height, and the two lakes together would have, for each meter added to them, a storage capacity of 75,000,000,000 tons—an amount beyond conception enormous. Within the next few months I expect to make my way southward to the great lakes of central Africa, and shall be able to discuss this matter from the standpoint of the conditions about Lake Victoria. As the civil engineers here estimate it the regulation of Victoria and Albert lakes could be accomplished at a cost of \$10,000,000, which is \$2,000,000 less than was the cost of building the Assiut dam.

THE IMPROVEMENT OF THE BLUE NILE.

If these projects for the White Nile are carried out, Egypt will have all the summer water she needs and much of her desert, not now irrigated, can be made fertile. The water supply will be constant all the year round, and there will be no objection to the use of the Blue Nile for the irrigation of the Sudan. That river will still be allowed to carry its heavy load of silt down to Egypt during the floods, but, in the summer, it may be so regulated by a dam at Lake Tsana as will furnish perennial irrigation to a large region near here. The Blue Nile is just about as long as from Philadelphia to Chicago. It rises in the mountains of Abyssinia at an altitude as great as that of the top of Mount Washington, and winds its way down through Abyssinia and the Sudan to Khartoum, where it joins the White Nile. The river here is about as wide as the Potomac at Washington, and its waters are now beautifully clear. During the floods they turn reddish brown, being loaded with a great quantity of the leaf mold of the Abyssinian forests and the scum of the volcanic rocks of the Abyssinian plateau. The river is navigable as far as the cataracts at Rosaries, which is 426 miles from here, and there are regular steamers plying upon it. Beyond that point the stream is known as the Abai. It flows out of Lake Tsana in a series of channels and light rapids, which soon unite to form a stream 700 feet wide, in which shape it flows on, narrowing and widening until it reaches Rosaries.

About five years ago one of the engineers of the Egyptian irrigation service, Mr. Dupuis, made an exploration of the Blue Nile and went around Lake Tsana. He estimates that the lake will store something like 2,000,000,000 tons of water, and that with the construction of proper dams and regulators, 15,000,000 tons per day can be given out from January until June. He says that Lake Tsana can be easily controlled, and that without affecting the large grazing lands which are found near its shores. Another dam might be made at the Rosaries rapids and the two would probably furnish sufficient water to irrigate a great part of the rich lands lying between the White and Blue Niles.

THE CONTROL OF THE ATBARA.

This same engineer made an investigation of the Atbara river. This is the Black Nile, which flows into the main stream about 300 miles north of the mouth of the Blue Nile. The Atbara is fed by the Abyssinian torrents, and while in flood it is of great size, although during the summer a large part of its bed is perfectly dry. It is called the Black Nile on account of its

color when in flood. At that time its waters are heavily charged with volcanic dust and it carries down with it quantities of the rich fertilizing mud to which the lower Nile valley owes its wonderful fertility. The river begins to rise in July. Its floods last about 60 days and it dries up toward the end of September.

Mr. Dupuis proposes a great reservoir near the apex of the Atbara delta. In this the water will drop its silt and, when it becomes clear it can be carried through different regulators into canals and used for irrigation. If this is done, considerable land at the junction of the Atbara and the main Nile can be irrigated, and a thriving region the Nile and Red sea road units with the great route from Cairo to the cape.

THE NILE A NEW RIVER.

The schemes that I have described are so far only in embryo. Sir William Garstin, who is at the head of the public works of Egypt and the Sudan, has made a report upon them and the government has sent out explorations along the different rivers to investigate their possibilities. They report many new things regarding the Nile system, the upper part of which is now the first time becoming known to the world. During a recent interview with the sirdar, Sir Reginald Wingate, I asked him whether we have yet gotten an accurate knowledge of the sources of the Nile and the actual flow of its waters.

"We are learning a great deal about it," was his reply. "We have surveyed the main stream from where it flows out of Victoria Nyanza and have followed it down to Khartoum. There are many of the tributaries, however, of which we know but little. It is now now exploring the vast system of streams which feeds the White Nile in the investigation of those streams which borders the Congo watershed. That country is difficult of access. It is covered with a rank vegetation consisting of papyrus, reeds and grasses, which are 15 or 18 feet in height, and our officers have to keep track of one another by sending up rockets from time to time. Our first attempts at the investigation of those streams were from the north, but we are now going to their headwaters and following the streams down to where they flow into the Nile. We are building boats there, and we hope to open such communication by steamer that goods can be taken by the Nile to and from the watershed of the Congo."

FRANK G. CARPENTER.

PUBLIC SPEAKER INTERRUPTED.

Public speakers are frequently interrupted by people coughing. This could be taken if Foley's Honey and Tar were used, as it cures coughs and colds and prevents pneumonia and consumption. The genuine contains no opiates and is a yellow package. For sale by F. J. Hill Drug Co. "The never substitutes."

SANTA HAS MOVED.

His Headquarters Are Now at 7-9 Main Street With Margetts Bros.

"Santa Claus," who for 16 years made his headquarters with Margetts Bros. at 40 Main, is now at 7-9. Not that he has deserted Margetts Bros. Forbid the thought, but Margetts Bros. book store is now at 7-9 Main, formerly the Utah Light & Railway office. The firm has much larger quarters now and is showing a much larger display of holiday goods than ever before. All sorts of toys and gifts for everyone in the family are there a plenty and in addition a fine line of beautiful pictures and art ware are being shown. Excellent stock at bed-rock prices are why Margetts Bros. announce for this holiday season.

LINES OF LAUGHTER.

"The politician may now take his car from the ground."
"So may the football player, if he cures to keep it as a relic."—Washington (D. C.) Herald.

It's funny, but a fish preserve is the last place in the world where one would expect to find a jelly fish.—Boston Courier.

O'Brien—"Is a queer thing about a cousin of mine. He has a great habit of walking in his sleep."
O'Toole—"Ye don't tell me? Can't he be cured of it, at all?"
O'Brien—"Cured of it? Sure, 'tis the maddin' of him; he's in the police force."—Illustrated Bits.

Considering how many times the Ten Commandments have been broken, it is almost a wonder that there are any of them left.—Somerville Journal.

"Stocks were all down a few points today," remarked the broker.
"The dealer" exclaimed his wife. "It's a wonder they didn't advertise it as a bargain day."—Catholic Standard and Times.

Insurance Official—Of what complaint did your father die?
Applicant—The jury found him guilty.—Weekly Telegraph.

Maud—Charles tried to propose to me last night. He made awful work of it.
Gertrude—Why didn't you help him out?
Maud—"Tean't necessary; papa came in and did it himself."

"Our new maid put wine glasses on the breakfast table."
"Did your wife remonstrate her?"
"No, we don't want to hurt her feelings, so we have wine every morning for breakfast."—Cleveland Plain Dealer.

"I know something you don't know," said the facetious youth to the fair debutante.
"What?" that" inquired the maiden.
"Your waist is quite-and down the back," replied the youth.—Detroit Free Press.

Employer—Are you satisfied in the use of interlocking fingers?
Applicant—No sir. I think a glass of beer occasionally.
Employer—How often is occasionally?
Applicant—Only when I am alone or with some one else.—Harper's Weekly.

The manager of an office had never found for an office boy. In consequence he was annoyed for an hour by a street-boy who had been of all kinds, cleaning various rooms and corridors.
"Well," he said to a late recruit, "if anyone can read anything and write anything, and handle a little and use the typewriter a little and—"
"That," interrupted the boy, "I could do all them things, I'd like the very best job. I ain't hardly out of my office yet."

He got the position.—Bismarckian.

PASSED EXAMINATION SUCCESSFULLY.

James Deane, New Britain, Conn., writes: "I tried several kidney remedies, and was treated by my best physician for diabetes, but did not improve until I took Foley's Kidney Cure. After the second bottle I noticed improvement, and five bottles cured me completely. I have since passed a strict examination for life insurance. I am now healthy and strong. I have no backache and all kinds of kidney troubles. For sale by F. J. Hill Drug Co. 'The never substitutes.'"

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