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[In early issues there will appear a tale entitled "A Legend of Rangala," also a story "Ralph Blake, the Young Artist" by Alfred H. Duncan.—ED. *L. R.*]

A MYSTERY OF THE SEA.

A TRUE STORY.

(*From the "Century Magazine."*)

In the summer of 1884 I was coming across the Indian Ocean in the steamship *Glenearn*, homeward-bound from Shanghai with a cargo of tea. We had passed Ceylon, catching a glimpse of the distant island and a whiff of the spicy breeze offshore, and were nearing the treacherous chain of coral reefs known as the Maldive Islands, when I came up from the cabin after dinner for a stroll on deck. The evening sky glowed with the beauty of a rich sunset such as is rarely seen outside the tropics. The good ship rocked easily upon a long, smooth swell, and plowed her way into a sea of molten gold, turning it, as by the touch of a magician's rod, into blue depths of water beneath her keel. The vessel's wake, churned into foam and shot through with countless flashes of phosphorescence, stretched far astern like a silvery path leading to the very edge of the full moon which hung just above the horizon.

I found the chief engineer leaning against the rail and enjoying the glorious beauty of the evening. For some time neither of us spoke. At length he remarked in a meditative way:

"It was just here that we met the Portuguese brig when we were coming out."

Now Nesbitt was a clear-headed Scot who had studied in one of the English universities and taken his degree; then, giving way to his passion for a roving life, he had gone to sea and spent twenty years afloat. He had doubled more than once the Horn and the Cape, made a dozen voyages to China and Japan, and, as an engineer in the Portuguese navy, had visited the whole coast of Africa, and once crossed the Dark Continent on foot just below the equator. In short, he had seen much of the world, and taken good note of what he saw.

The chief engineer, therefore, was a man who had in his head much material for a good story; and it was in the hope of getting a story now that I asked:

"Well, what about the Portuguese brig?"

He looked up in surprise.

"What! Haven't you heard of the adventure we had on the last trip out? No? 'Bout as curious a thing as I ever came within hail of. But it's a long yarn; so let's find some seats first, and then I 'll spin it for you."

We took possession of a couple of steamer chairs on the after-deck, and forthwith the chief spun his yarn as follows:

"We came out in February loaded mostly with iron; had a rough time of it in the Bay of Biscay and the Mediterranean, but when we had gotten past those cussed Frenchmen on the Suez Canal our troubles for that voyage were over. Those canal pilots make an engineer swear more than a storm at sea.

"Well, just in this place, one day about noon we passed a brig about four miles north of us. The sun was hot, there was not a breath of wind, and the brig lay rocking on the swell with all sail set and flapping. She showed no colors, and failed to answer the signals which we made to her. The captain swore a little at her want of manners and we went on; but when we had passed her some distance, perhaps a couple of miles, I went on the bridge and found him still leveling his glass at her. As I came up he said, 'I don't like the looks of that craft at all. She isn't ship-shape, and I am going to run over to her and find out what's wrong.'

"He put the steamer's head for the brig, and soon we were as close as the swell would allow. We hailed her, but got no reply. Then the old man began to get excited, and ordered the mate to call away the crew of the cutter and investigate. When the mate came close alongside, he hailed again. Still no reply. She lay with her starboard beam towards us. He pulled around her stern and found the port gangway open. A man in a red shirt and a pair of trousers sat there on the deck, his legs hanging over the side. He was leaning back upon a box under his left arm, and a red handkerchief trailed from his right hand across his lap. A loud hail at close quarters brought no movement or response, and a sudden awe fell upon the boat's crew. The man was dead.

"The mate pulled forward to the bow and climbed up the chains to the deck. He said afterward that nothing would have hired him to climb into the gangway beside that silent figure. Four men lay on the deck around the forward hatch. They had been dead a long time, and the burning sun poured down upon ghastly bodies which were almost skeletons, they were so thin.

"The crew of the cutter were ordered up, and they searched the ship from stem to stern. They found no one in the forecastle or the hold, and no one in the cabin; but in the galley they found the Malay cook and the cabin-boy, both dead, the cook lying upon his face with his fingers twisted in his long black hair. All the men except the captain seemed to have died in agony, for their bodies were writhed and twisted.

"There was plenty of food aboard—a cask of salt beef, several hundred-weight of rice, and some flour. There were plenty of coals for the galley fire. The ship was perfectly sound, not a sail was split, not a halyard started; the masts and spars were all secure, and the wheel and rudder in good order. *But there was not a drop of water aboard.* Here was the secret of the tragedy. Every water-cask was dry, every butt had been upset and drained to the last drop. The little cabin-boy lay with his head and shoulders inside one of the overturned

casks, and his stiff fingers grasped a tin cup into which he had been trying to drain a few drops water.

"The ship's papers and two or three hundred Mexican dollars were in the despatch-box under the captain's elbow. I translated the papers—which were in Portuguese—when they were brought aboard the steamer. They showed that the brig was Portuguese, registered at Goa. Her name was the *Santa Maria*, and she had cleared from Goa three months before for a trading voyage along the west coast of India. Her master was also her owner; his name was signed to the papers with a cross. There was not, as it seemed, a single man on board who could write, for no log was found. There was a compass and a crude chart of the Indian coast in the cabin, but no sextant or chronometer and no signal-flags.

"So these poor wretches had probably been blown off the coast by a storm, and once out of sight of land they lost their bearings and could not find the way back again. Their supply of water gave out, and they died. But judging from the size of the brig, she required a crew of about fifteen men to handle her, and there were only seven bodies on board. What became of the others no one can tell. They may have drunk salt water, gone mad, and jumped into the sea to end their misery. There were lots of sharks swimming about the brig when we found her.

"I said there was no log on board Perhaps that is true and perhaps it is not. On the deck by the captain's side was a little heap of pebbles which had evidently been brought up from the ballast, and carefully piled in one corner of the despatch-box beside the ship's papers were seventeen of these same pebbles. It is not unlikely that each pebble represented a day of thirst and watching. It makes me shudder, even now—the picture of that red-shirted captain sitting in the waist of the ship watching for a sail, and seeing his crew, maddened by thirst or by salt water, jump down one by one into the jaws of the sharks waiting below. I always think of that captain as catching sight of some steamer on the horizon and raising himself to wave his red handkerchief, his only signal of distress, then, as the steamer keeps on her course, falling back in despair—to die!"

We sat for a long time in silence, while the steady throb of the steamer's iron heart drove her forward into the night. At length I asked:

"What did you do with her?"

"We could not take her into port, and it is against the law to leave a vessel adrift upon the high seas. So when the mate had come back with a white face and told his story the captain sent the crew over to the brig and dismantled her. We took out her stores, cordage, sails, and everything we could move. Then the carpenter went down and bored a lot of holes in her bottom. We put all the bodies in the cabin and laid the ship's flag over them. The captain read the prayer from the burial service. Then we locked the cabin-door and left her; and as we steamed away we could see her slowly settling down.

"We turned over everything belonging to her to the Portuguese consul at Singapore; and if you will ask the captain he will show you the letter of thanks he got from Portugal, with King Luis's own signature. The consul wrote to Goa and advertised in all the eastern papers three months for some one who could claim the things, but without success. At length they were sold and converted to the crown, for no living soul could be found who knew anything about the *Santa Maria* or her crew."

EDWIN K. BUTTOLPH.

ELECTRIC CARS AND ELECTRIC RAILWAYS IN GENERAL.

Britishers and Colonials who have not visited America know little of the great strides the New World has taken in reducing electricity and electric motors into subservience to man and his requirements. For the present its principal use, as a motor, is in propelling street cars, and for this purpose it is to be seen in nearly every city or town of importance in North America, save New York and Washington. What is the steepest gradient on smooth rails on which a locomotive can drag a load? In Ceylon the steepest gradient is one in 40 ft., and this till quite recently was thought by me to be the maximum for the world. On the Canadian Pacific Railway, however, the gradient, for a long distance among the Selkirk glaciers, *is one foot in 25*, but particular precautions are taken to prevent accidents, two extra locomotives of over 80 tons each being attached to the train, and both with 6 extra men to screw down the breaks if necessary. In the Transandine Railway, from the Argentine Republic to Chile, an engineer who has just returned from thence informs me that, in more than one place, the line is at a gradient of *one foot in 23*, which beats the Canadian Pacific by a good deal; yet a Yankee confidently informed me that at Tacoma, Wash. county, they have an electric street car line running at a gradient of *1 ft. in 8*! I saw some corroboration of this in a San Francisco paper the other day. At Toronto I saw these electric cars running on ordinary rails up streets which seemed to me at the very least 1 ft. in 12, but appearances are deceptive. Again, at Fort Worth in Texas, I saw electric cars full of people going at 8 to 12 miles an hour up a hill, that no horse could have dragged a carriage up at any quicker rate than a walk On wet or muddy days the wheels emit brilliant rose- and blue-colored sparks at the point where they lose contact with the rails. The method of working these cars is rather complicated to those who do not understand the rudiments of electricity. First of all we have the generating establishment in which the number of the dynamos and the power of the steam engines is regulated according to the number of cars on the line. The power of the steam engine is transmitted in the usual way by belting to the dynamos, where it is turned into electricity and the current transmitted by wires over the entire length of the car lines. On either side of the roads or streets through which the lines run are placed poles with insulated wires attached to their tops, and stretched across the roadway. On these cross wires (placed at equal distances) is hung the main cable, directly above the car line. From the roof of the car, a rod is slung with a runner at the end, which travels along the overhanging cable, and transmits the electricity to the motor, which is fixed in the bottom of the car. The stopping and starting, speeding and slowing of the car is under complete control, one man being sufficient to collect the fares and work the motor! The faster the car travels, the less electricity it absorbs, up to a certain point, beyond which a counter current is excited, and the motor instead of receiving commences to give out electricity. When this happens the movement of the car is retarded! I was rather surprised to find that 55% of efficiency was secured from the engines employed in working the dynamos. I should have thought a much larger amount than 45% would have been lost in working their long stretches of wire, and changing and rechanging their forces, 1st, from steam to electricity, and then from the generator to the motor. On cable cars, *i.e.*, cars worked by wire cables, the

amount of efficiency is only 20%, as against 55% on electric roads, a clear gain of 35%. On some of the long straight runs in the suburbs of Fort Worth in Texas, they run the cars for short distances at twenty miles an hour, and in Los Angeles, California, they run two cars coupled together like railway carriages, the foremost being for first, the latter for second class passengers. A lot of people object to the overhead wires, but I am afraid these cannot be avoided. They have tried having them underground, but this did not answer on account of the avidity with which mother earth absorbs electricity and causing frequent miscarriages in the current. One drawback I experienced was the liability of one's watch to get magnetized by constant travel in these cars. People can't for the life of them find out what is the matter with their watches, till their watchmaker puts a small compass over the hair spring, and then they will see for themselves that the spinning needle tells the story of the presence of a powerful magnet. Both in the States and in London non-magnetizable watches are now sold, and it cost me 25*s.* to get mine made so! A motor that will drag a load up an incline of one in twenty, and think nothing of it, and is capable of travelling at 20 miles an hour seems to me most fitted for a rough railway, and could with ease be run along the cart road from Polgahawela to Kurunegala without any more cutting than was necessary for laying the rails. At the present day 244 electric railways are in work in the U. S. America, and 79 in the course of construction. The total mileage is 2,300. An American paper, the *San Francisco Bulletin* referring to Boston city says:—"The good people of the 'Hub' conclude that clean streets, clean cars, and rapid transit are preferable to jog-trot and horse manure." Again, Thomas Lawry, President of the "American Street Railway Association," speaking in Buffalo said; "I am so thoroughly convinced that electricity is the coming power for street railways (except on very heavy grades where the cable is best suited), that this is the last convention that will seriously consider horses for the operation of street railways."

T. D., Jr.

ARCHÆOLOGICAL RUINS IN THE NEIGHBOURHOOD OF NUWARA ELIYA.

(From a Correspondent.)

The drive on the new Udapussellawa road, with beautiful alternations of forest and grass land, patanas, magnificent gorges, fern-covered gullies and waterfalls, the waterfall and grotto on Portswood estate takes you to a striking change. Nature has no end of surprises. There are a few spots which can rival the number and variety of its attractions.

It will amply repay to follow to the eastern outskirts of Nuwara Eliya.

You have a splendid drive along one of the finest roads in the island. First, then, you take leave of the town between Lover's Leap and the Hává Eliya lake, the latter a reservoir of recent times for Uva irrigation purposes. You at once enter fine fields of tea—Fairy Land—Pedro—with the famous bungalow overstepping it and Summer Hill, a stream guarding as it were a premoval forest. A cave of immense length is reported to exist hard by the waterfall on Portswood and close to the P. W. D. lines. The natives name this estate "Nónátottam" after a lady, Court Lodge, Excelsior, Alpha and Hethersett or "Púpani," after the name of the gentleman, Flowerdew, who opened it. There is a storehouse, a post office and a few "kaddies," the latter not very flourishing after the removal of a liquor shop that had existed, except perhaps for receivers of estate produce. To the left branches off the ancient bridle road to Maturata. You now descend a circuitous way all the same well worthy of the trouble. The scenery as far as the eye could measure with fields of coffee, tea, and cinchonas, here a bungalow and there a store or factory, with noiseless streams and yet with abundance of water in them, has to be imagined than described. Kenmare, Park, Hillside, St. John's, Brookside and other plantations too numerous to mention, all testifying to the enterprize of the pioneers of old who were the transformers of what certainly was a wilderness when the elephant and the other wild animals made it their homes.

Udapussellawa proper rises as you advance, but despite the murmur of the brooks and the tempting sights, the trap has to be left at the 11th mile. I should lead the visitor up the rideable road, cross the Maturata-Fort Macdonald road. Next comes Ragala estate. Its tennis and playground remind one of the fact that amidst all his little adversities, remote and unfriended as he is, the Ceylon planter would make his life a happy one. But what is this black stuff the hill abounds with? Mining again! One would think a mine of wealth to be here—in iron. And why all these trenches on all sides of the hill! They have a history of their own. Halgaranawa, now St. Leonards, once formed the boundary and gateway of the Uva principality. Every traveller to or from Kandy in the days gone by should necessarily lodge here and wash his rice—hence the name. Now there lived an outcast King by name Kotamaparajjuruwo, reigning according to his own sweet will. This despot not only levied black-mail, but exacted rājakāriya from every passenger, be he of whatever grade, if not otherwise protected. He may have had an irrigation scheme of his own, though that scheme is past all comprehension. But yet there the trenches are in all directions of the plain down to the ravines below. Three miles more, and you are in the heart of what was assuredly a very popular town. Oh! the stability of earthly possessions! The attempt to describe the view from here is simply impossible. Truly delightful. Suffice to remark that from here Dumbara and Bintenna and a portion of Diyatalawa—veiled in clouds—bordered by the Mahaweliganga, far away are yet so near. The cluster of villages, so many in each valley [I derive Walapane from 50 valleys] is beyond one day's outing. One rising town is worth notice, and that is Nel-danda-Hinna, immediately at the foot of the hill. Here is a Government bungalow, a Government school, a Gansabhawa (presided over by a very efficient native gentleman with a sound judicial training), Ratemahatmaya's house, a group of boutiques, and last but not the least, an Experimental Garden looked after by an agricultural teacher. This garden meets a much-felt want to the Walapane villager, whose proclivity to thieving and antipathy to till the ground are so proverbial. Nothing could have been devised better, and the mere attempt will redound to the genius of its originator.

We halt now by the branch bridle-path leading to Maha Uva estate, with very sad recollections for the late lamented John Whitefoord, always so militant for the poor villager. Traces of buildings, real castles at one time, stone walls, enclosures, music halls, "gi maduwa" where there was an establishment for weaving cloth "Algetenna"—I suppose not as a commercial concern but only as a necessary appendage—stables for elephants "Etgāla"—possessions of kings who now lie in glory, every one in his own house. Miniature ram-

parts, stray monolithic pillars and a tank are seen. From this tank, there is a trace of—one could hardly conceive—a subterranean tunnel connecting it with the oya below, some mile and a half further below. The legend goes that whilst an army of infantry was wending its way through it, the king sent his elephants and trod them to the ground, so that for days the stream flowed blood. Be this as it may, is not the name Yak-katu-oya significant of some tragedy?

I would now turn to the left slope and take you a zigzag turn, also rideable, to breathe more of historical atmosphere. Half a mile's ascent and you get to the loveliest spot: jackals, monkeys, squirrels, deer and elk may be inducement to a sportsman to enter this forest-land. Large trees, some 10 feet or more in circumference at base, may give an idea of the ravages of time. This is Holee Kotte or Fort of the Cholia Kings. A tank with acres of level ground surrounding it, two streams running on either side, and parallel, well-defined courtyards, stone walls, strong carved stones deserve description by a better pen. What does history say? To a lay visitor reflections occur as to the sage bard of the Highlands:

Ban, Ban, Caliban,—
Give me a new master and I'll be a new man.

A FEW NOTES CONCERNING LAND TENURES, &c., IN CEYLON:

AS THEY WERE IN 1864.

(From a Correspondent.)

1. In the time of the native dynasty all lands were originally the property of the King.

2. Lands were granted by him to chiefs for services civil, military or literary, and by way of favor. They were never sold or taxed.

3. Squatters were confirmed in possession of properties, which they had brought into cultivation.

4. The Temples had very extensive lands given to them.

5. Grants were made of tracts for villages to castes for services past or prospective. Such as to the Challias for peeling cinnamon, Dhobies for washing, Barbers for shaving, &c., &c., &c.

6. On the death of owners without heirs, or on the relinquishment of any special service by descendants, the lands reverted to the Crown, and were then called respectively Mallepalla or Nillepalla.

7. Special grants were made on condition of payment of ½ or ⅓, or some other proportion of the crop.

8. Grants made to Temples were frequently inscribed on a rock or cut slab.

9. Royal grants were usually on silver or copper plates, sometimes on gold ones. Representations of the sun and moon adorned the plates, on which the following words appeared: "So long as the sun and moon, and Maha Meru shall endure," &c. Maha Meru was a mountain round which the sun was supposed to run his course.

10. Chiefs took their names from their lands, and the lands from some peculiarity in them, such as a rock, or some prevailing tree, &c.

11. The areas were expressed by the word 'ammonam,' a measure of 32 bushels, and equivalent to a sowing extent of about 2¼ acres.

12. The Portuguese continued this system with occasional modifications. They first introduced the tax of $\frac{1}{10}$th on paddy for the maintenance of the church establishment.

13. The Cinnamon Gardens in Colombo and throughout the Western Province were planted by them. Cinnamon was Government monopoly.

14. The Dutch followed the same course, viz. granting lands for service, but never sold them. They introduced a register called the Thombo which gave a description of the land, and the number of fruit trees, but no figure of survey.

15. The English in 1803 confirmed all owners in their rights to lands, and grants were made on condition of cultivation.

16. Sales of land at the upset price of 5s. per acre were first commenced in 1833, when the first coffee estate was opened. Upset price of land was raised to £1 in 1844, when coffee began to be extensively cultivated.

17. All sales are conducted at public auction. No lot to exceed 600 acres in extent. The greatest price realized was £9 for one lot of 500 acres in Matelle. Surveys precede sales.

18. A first-class coffee plantation in full bearing costs about £30 an acre, and under favorable circumstances will produce, it is said, as much as 15 cwts., but the average production throughout the island may be taken as less than 5. The best elevation for coffee is from 1,500 to 4,000 feet above the sea.

19. Last year's crop was 787,501 cwts. plantation and native.

20. Area of cultivation approximately.

	Acres.
Coffee estates and land sold for coffee ..	497,250
Cocoanuts	556,000
Cinnamon	14,400
Rice	40,000

21. Persons in undisturbed possession of Crown land for 10 years may claim it on payment of the half improved value of the land, together with survey fees. If more than 30 years, payment of survey fees is alone required.

22. An ordinance for Registration to Titles of Land has been just passed, to be based on a cadastral survey. The system adopted in Belgium will be for the most part carried out, an English Royal Commission having favorably reported on its working and results.

INDIAN ETHNOGRAPHY.

Our Indian dependencies form vast field for ethnological inquiry which we have not as yet sufficiently cultivated; in fact, its importance is realized by but very few. What is really required is a systematic study of the various races of India, carried out according to a definite plan. Independent observers may do, and many have done, much; but by co-ordination more and better work can be accomplished. The Bureau of Ethnology in Washington has for its especial object the investigation and recording of all that relates to the North American Indians, and the splendid series of Reports issued by that Bureau form an invaluable mine of information on American anthropology. Is it too much to ask from our Government that we should have an analogous Bureau of Indian Ethnography? It would not suffice merely to have a department for researches on Indian ethnology, and for the publication of the results; something more than this is wanted. It would be necessary to have a library of works relating to Southern Asia, and to have an elaborately classified catalogue of books, memoirs, articles, and so forth, on every branch of Indian anthropology. Were this done, anyone who wished for information about a particular district would be able to find references to all that was known about the people, their customs, arts, and crafts. The catalogue should be a systematic bibliography, irrespective of the actual contents of the library of the institution, though every endeavour should be made to make this as complete as possible.

Such a Bureau, if properly directed, would serve as a great stimulus to those who are interested in the native races of India, but who require encouragement and direction. There can be little doubt that an immense number of isolated observations are lost for the lack of a suitable depository, the recorders of such observations being fully aware that these are too casual to be of much value; when accumulated, however, the

case is very different. Were it known that a record of any obscure or rarely observed custom would be duly filed and so classified as to be readily available to anyone who was studying Indian folk-lore, the probability is that many memoranda would find their way to the Bureau which otherwise would be lost.

It cannot be too often or too strongly insisted upon that now is the time for the collection of all anthropological data in every department of that far-reaching science. To many, results are alone interesting, and there is too frequently a danger to generalize from imperfect data. Unfortunately in no department of science is it more easy to theorize than in this, and those who have not sufficiently studied the subject are often the most given to framing hypotheses which are as easy to refute as they are to make, and it is this which has brought discredit upon anthropology. Posterity will have plenty of time in which to generalize and theorize, but it will have scarcely any opportunity for recording new facts. This century has been one of most rapid transition. The apathy of our predecessors has lost to us an immense amount of information: let not this reproach be applied to us by our descendants.

The change which is everywhere noticeable is from individuality to uniformity. Religious beliefs are less varied than formerly, there are fewer local customs, there is greater uniformity in dress and personal ornament, the tools and weapons of the white man are now cosmopolitan. It is unnecessary to multiply instances: every book of travel directly or indirectly witnesses to these facts. The vulgarization of Oriental fabrics, the degeneration of Japanese art products, also testify to a levelling down, which together with a levelling up is characteristic of our modern civilization.

Every effort should be welcomed which endeavours to place on permanent record local peculiarities of any sort, and it is with pleasure we notice the too short paper* in which Herr L. H. Fischer gives the results of his personal investigations on the jewellery of the people of India and on the manner in which it is worn. As the author points out, the Hindoos are very fond of ornament: the ears, nose, neck, upper and lower arms, fingers, ankles, and toes are adorned; but not the lips, as in some African and American tribes.

The culture and history of a people are intimately interwoven, and Indian history is so complicated that India at the present time appears at first sight to be a conglomeration of races, religions, languages, and States which can scarcely be unravelled; and now this is further complicated by the introduction of European culture.

At first it seems almost impossible to discriminate the typical ornaments of the separate race-stems, but in time it is discovered that the lower classes keep to traditional forms. The village smith transmits his art from father to son and grandson, always with the same archaic moulds, the same simple tools, the same designs; and it is only the present luxury which induces fashions. The author chiefly turned his attention to the jewellery which the main mass of the people wear, and not to that of the rich, for this appears to be frequently imitated from European articles.

The material which in India is employed for jewellery is mainly silver, pure or in mixture with tin, zinc, and lead; of these, there are many alloys which constitute a gold-like metal. As a rule, yellow metal obtains in the south and white metal in the north-west, silver always predominating. In Peshawur, for example, there is hardly anything but silver. Gold is rare in India.

India possesses all known kinds of precious and less precious stones, but the polishing is as a rule very primitive. Particular provinces appear to have a predilection for stones of a certain colour; thus, in the Madras Presidency especially, green stones are almost invariably worn in the men's earrings. In Jeypore, ornaments of Indian garnets can be bought in great abundance, and the turquoise is characteristic of the Himalaya district. Naturally all kinds of stones are imitated in glass: there are glass arm-rings in South India which are principally made in Poona, Taragalla, and Surat, and are much worn. Ivory, coral, pearls, shells, and other materials are also pressed into the service of personal adornment. Bracelets made from the Changu (*Turbinella rapa*) occur in varied form in the Dacca district. The author only occasionally saw mother-of-pearl fabricated into amulets and in Ceylon into rings.

The author then goes on to describe the costume and types of ornaments characteristic of various parts of India. Numerous sketches of old kinds of jewellery illustrate the paper. There are ten representations of women from different districts scattered in the text, one of which, a Tamil from Trichinopoly, we reproduce as a specimen of the illustrations to the paper. There are also six plates of full-length portraits of women in typical costumes, three of which are in colours.

Specimens illustrative of this paper and collected by the author are to be found in the Vienna Museum. There is also in the Berlin Königliche Museum für Völkerkunde a fine collection illustrating Indian ethnography, which is arranged in a most instructive manner. Maps, photographs, and models are liberally interspersed, and the labelling is exceptionally good. Jewellery is dealt with ethnographically, and not merely as a branch of æsthetics, the use of the trinkets being illustrated by photographs and models. One thing is certain—that is, that Germans need not go further than Berlin if they desire to have an intelligent and comprehensive presentment of Indian ethnology. So firm is the conviction of Dr. Bastian, the energetic Director of the Museum, of the present necessity for gathering up the dying-away remnants of more or less barbaric and savage peoples, that he is once more on a collecting tour—this time in India—and is continually sending to Berlin cases of specimens, regardless alike of cost and space for exhibition. He feels that it is now his duty to collect, and this spirit is manifest in other departments of the Museum, notably also in one illustrative of another of our British colonies. Capt. Jacobsen is one of the best collectors, and he has brought together an invaluable collection from North America, especially from British Columbia, the long series of grotesque dance-masks being of particular interest.

It is convenient for European ethnologists that these objects are in such an accessible Museum as that in Berlin; but we, as Englishmen, would like to see the ethnography of all our British colonies as fully represented in our own National Museum. It is true there does not at present exist any machinery for making special collections, nor was there in Berlin until enthusiasts like Dr. Bastian and others created it. There are difficulties with regard to fund and storage-room; perhaps Dr. Bastian's plan of ignoring these problems and of securing the specimens is not so very bad after all.

It may be urged that we already have an Indian Museum. This is true, but that collection is little more than an assemblage of specimens.

A museum has at the present day quite a different object from what it had in the past. The distinction can be put succinctly by an analogy; most of the older museums bear the same relation to modern museums that dictionaries do to text-books. Most people will admit that the perusal of lexicons is somewhat monotonous and dull, and similary the arrangement of the old class of museums was such as to give the least amount of instruction beyond the bare fact of the existence of given objects.

Large national collections should be exhaustive, and this necessitates a multiplicity of objects but that should not preclude a scheme of arrangement which would make the specimens yield the maximum amount of information they are capable of giving. The Indian Museum affords an example of the worst style of museum arrangement.

* "Indischer Volksschmuck und die Art ihn zu Tragen," L. H. Fischer, 30 pp., 51 woodcuts and 6 plates, *Annalen des k.k. Naturhistorischen Hofmuseums*, Bd. v, Nr. 3 (Wien, 1890).

The public has a right to expect that national specimens shall be arranged in the best possible manner, and the Government should appreciate the fact that museums, if properly conducted, afford the most interesting and vivid means for conveying instruction. ALFRED C. HADDON.
—*Nature.*

ACCOUNT OF THE WORKS OF IRRIGATION CONSTRUCTED BY KING PRAKRAMA BAHOO, CONTAINED IN THE SIXTY-EIGHTH AND SEVENTY-NINTH CHAPTERS OF THE MAHA WANSO, WITH INTRODUCTORY REMARKS,

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(*From the "Ceylon Almanac" for 1857.*)

The following extract from the Maha Wanso, having reference to works of irrigation executed in the reign of Prakrama Báhú I., (A. D. 1153—1186) were translated at the request of the Editor of the Ceylon Almanac,* and may not prove altogether devoid of interest, in connection with the very able and interesting papers on the subject of ancient irrigation in Ceylon, recently published by order of Government. The Sovereign alluded to is the celebrated "Prakrama Bahoo the Great," the constructor of the "Sea of Prákrama," the invader of India and Burmah; and whose reign Mr. Turnour characterizes as "the most martial, enterprising, and glorious in Singhalese History."

The first extract is the 68th chapter of the Maha Wanso, and contains an account of the efforts made by Prakrama Báhú to promote the cultivation of rice, on his assuming the Government of the *Pihiti Ratta*,† under the title of Mahá Pádo (or sub king.) The second extract is a part of the concluding chapter of the reign of the same monarch, and gives a summary account of the principal public works executed during his government. It consists of 87 verses, of which the first 24 relate to the formation of extensive gardens and plantations; the next 26 to the construction of tanks and canals; and the last 27 to the erection of various public buildings, such as, dagobas, image houses, preaching halls, inns or houses for strangers, libraries, theatres, &c. I have only translated the verses relating to tanks; those which have reference to canals and watercourses having already been translated and published by Mr. Turnour in the Ceylon Almanac for 1834.

I have not thought it necessary to add any comments of my own, by way of illustrating the translation; but I may perhaps be permitted to say a word in reference to information which a passage in the first extract gives respecting the "Sea of Prakrama," to which so much attention has lately been drawn by the publication of that valuable contribution to the ancient History of Ceylon,—the "Report on the Ellahara Canal, by Messrs. Adams, Churchill and Bailey."

As stated by these Gentlemen, "the situation of the Sea of Prakrama has never hitherto been satisfactorily, ascertained."

Turnour states (vide Ceylon Almanac of 1834, p 68) that "the Sea of Prakrama with its embankments of many outlets is yet unknown, or at least unnoticed."

Major Forbes indeed surmised that the series of Lakes connected by the Ellahara Canal, might be the waters to which the vanity of a king gave his own name, but he adds, that "until this canal shall have been traced through the Konduruwawe hills, the extent and difficulty of such an undertaking must excite doubts whether it were successfully accomplished."

The explorers of the Ellahara Canal, were, however, the first who declared their belief, that the series of Tanks connected by this canal were the waters which bore the name of "the Sea of Prakrama."

It does not however appear, that this opinion is corroborated by the Maha Wanso, since in a passage in the 68th chapter, mention is made of a particular tank, which was afterwards called the "*Sea of Prakrama.*"

The passage alluded to is the following:—

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සංවඩ්ඪිතුවචනායාම විත්ථාරතපීරපාලිකං
අබ්භුන්නතමහාවාරි පාතංසජලනිග්ගමං
පරක්කමසමුද්දුත්තිවොහාරංවාපිරොපයි"

Ativa Kuddakan puobe "*Pandawapin*" cha kariya,
Sinwaddhituchchatayama wittharatthira palikan,
Abbhunnata mahawaripatan sajala niggaman,
"Parakkama samuddoti," woharancha bhiropayi.

"Moreover having made Panda Wapi (Panda tank which was formerly very small indeed, (into one) containing a body of water great and exceedingly lofty having outlets for the water, and an embankment of greatly increased height, length, breadth and strength, —he gave it the name of the 'Sea of Prakrama.'"*

I am not prepared to say what particular tank is meant by "Panda Wapi," in this passage, as I have not been able to meet with any information either in the Maha Wanso or in any other work, which would enable to me to identify it with any degree of certainty. The name *Panda Wapi* occurs but twice in the previous part of the Maha Wanso. King Mahadathieko Maha Nago is said to have bestowed the "*Panda Wapi Wihara*," i.e. "*the Panda Tank Wihara*," on a certain Samanero, which proves the existence of a tank of that name so early as A. D. 8 (Vide Turnour's translation of the Maha Wanso, p, 214.) The next reference to *Panda Wapi* is in the 60th chapter of the Maha Wanso, in which it is mentioned as one of the tanks constructed (or repaired) by King Wijaya Bahu I.,† who, reigned at Pollonnaruwa A. D. 1071—1126

Dunta, Katunnaru, Panda Wapi, Kalagalla, Eranad-

* [This paper, although by permission inserted here in consequence of its connection with the subject of those preceding, was intended for the Journal of the Ceylon Branch of the Royal Asiatic Society, and will also appear in that publication, when the next number of the Society's Transactions is issued.—*Ed. C. A.*]

† "The ancient divisions of Ceylon were *Pihiti Ratta*, bounded on the west, north, and east: by the sea; on the south by the Mahawelli Ganga, and Dedroo Oya rivers; it was also sometimes called Raaja Ratta as the ancient capitals were situated in it.

Ruhunu Ratta, bounded on the west and north by the Mahawelli Ganga, and Kalooganga (or Caltura) rivers, and on the east and south by the sea. The mountainous portion of it was called Malaya Ratta.

Maya Ratta, bounded on the north by the Dedroo Oya, on the east by the Mahawelliganga and the mountains, on the south by the Kalluganga, and on the west by the sea.—(Turnour, Ceylon Almanac, 1834, p. 27.)

* [It is somewhat remarkable that the above important passage in the Maha Wanso should have escaped Mr. Turnour's researches, since he gives the following account of the outlets from the "Sea of Prakrama," which is quoted by the authors of the Report of the Ellahara Canal. "The king [Prakrama] formed the deep canal called the Makara Ganga, which flowed from the Makara outlet of the sea of Prakrama: from the same sea, the great canal Haima Wattee flowing to the Maha-Maigee-Wama. From the outlet called Samanmal, the canal distinguished by the name of Neela-Wapane: flowing from the outlet called the Keela-Kara Oodyaane, the Salalawatte Canal: flowing from the outlet celebrated under the name of Waitra-Watee, the Waitra-Watee Great Canal: from the southern outlet, the Toongha-badsa Canal: flowing from the Mangala outlet, the Manga a Ganga Canal: flowing from the eastern outlet, the Champua Canal: flowing from the same sea to the Poornawaruhana Tank, the Saraswasttee Canal: flowing westward of that (Saraswastee) canal, the Waimawattee Canal." No less than ten outlets are here enumerated, as formed by the king to convey, in different directions, the accumulated waters of the tank named after himself. Of these, four appear from their names and description to have been much larger than the rest. The identification of the Sea of Prakrama, therefore, seems to depend upon the discovery, in Padivel Colum, or any other of the large tanks, of ten outlets corresponding with those mentioned in the above extract.—ED. *C. A.*]

† As this part of the Maha Wanso has not been translated into English, I annex a translation of the verses relating to works of irrigation in this reign.

The tanks of Mahaheli, Rehera (Sairuwella Maha?)

I am, however, inclined to think, that we may recognize the *Panda Wapi* of the Maha Wanso, in the modern Padavi or Padavil Colum of the Wanny District.

The reasons which have led me to form this conjecture are, 1st, the similarity, or rather the identity, of the names; for the Pali word *Wapi*, and the Tamil word *Kulam* (erroneously spelt *Colom*) both mean *Tank*, so that in fact the Pali term *Panda Wapi* is an equivalent for the Tamil, *Panda* or *Pandi Colum** which may have been corrupted into *Padavi* or *Padavil Colum*.

Secondly the stupendous size and magnitude of the work.

Sir Emerson Tennent, who gives an interesting account of this tank in his work entitled "Christianity in Ceylon," calls it *the largest as well as the most perfect of these gigantic works in Ceylon*," and speaks of it in such terms as would not be inappropriate in describing such a tank as "the Sea of Prakrama" must have been.

But the most interesting account, as well as that which gives us the loftiest ideas of this gigantic work, is that contained in the Governor's Minute on the Eastern Province.

His Excellency says, that "it is the most wonderful work that I have yet visited, whether we look to size, difficulties of execution, or to the time at which these difficulties were surmounted." "North of these again, about 40 miles, is *Padiwel Colum, the most gigantic work of all*, for the bund which is in perfect repair, except at the one spot where, in the course of ages, the waters have forced a passage between it and the natural hills, which it united, is 11 miles long, 30 feet broad at the summit, 180 feet at the base, and 70 feet high." "Padiwel Colum, the greater part of which I rode or walked over, was formed by the waters of the rivers Morray Oya and Moonguna Oya, confined to the plain, by the enormous bund which I have just described. *Its construction must have occupied a million of people for 10 or 15 years.*"

The most satisfactory way of settling the question as to the identity of this tank would probably be by obtaining a fac-simile and translation of the inscription to which Sir Emerson Tennent thus alludes, in his note on the tanks, already referred to.

On the top of the great embankment itself, and close by the breach, there stands a tall sculptured stone, with two engraved compartments, that no doubt record its history, but the Odear informed us that the characters were Nagari and th language Pali, or some unknown tongue, which no one can now read."

I have only to add, that my object in submitting the accompanying translation, is by no means to advance any hypothesis of my own on the subject, but simply to put parties competent to decide on the point, in possession of the data contained in the hitherto untranslated part of the Maha Wanso, and especially to aid the investigations of those gentlemen whose meritorious labours have already invested the subject with so great an interest.

CHAPTER LXVIII.

This sovereign of lofty aspirations, who was well acquainted with foreign countries, thus thought (within himself.)

"In what well governed kingdom is the administration of affairs conducted, without obtaining a knowledge of its means.

"The object of my sovereignty is the advancement of the prosperity of Religion and the State, having vanquished all enemies. This kingdom although very small, being filled with great prosperity, I shall by the superiority of my wisdom, soon bring into such a state as that it will surpass the greatness of other kingdoms.

"Conferring appointments on my officers whose advancement is identical with my own, according to their respective merits, rewarding them with honours and wealth, causing my own people to settle in various parts within my dominions from the mountain Samanta Kuta (Adams' Peak) as far as the Sea Coast, the cultivation of grain should be carried on in as many ways as possible."

Having thus reflected, the King thus addressed his officers.

"In my kingdom are many paddy fields cultivated by means of rain water, but few indeed are those which are cultivated by means of perennial streams, and great tanks.

"By rocks, and by many thick forests, by great marshes is the land covered.

"In such a country, let not even a small quantity of water obtained by rain, go to the sea, without benefiting man.

"Paddy fields should be formed in every place, excluding those only that produce gems, gold, and other precious things.

"It does not become persons in our situation to live enjoying our own ease, and unmindful of the interests of the people. And ye all, be ye not discouraged, when a necessary, but a difficult work is on hand. Regard it not indeed as a work of difficulty, but following my advice, accomplish it, without opposing my instructions."

The highly renowned Monarch, then, ordered the construction of the great embankment celebrated under the name of *Kotta Baddha*, which had long been swept away by the action of the river, leaving behind nothing but the name, and which indeed had baffled the attempts of former kings (to keep in repair.)

Whereupon the ministers, one and all, represented, in various ways, the extreme difficulty of the work, and the instability of it, even if it could be accomplished.

The King rejecting their councils, (remarked) "What is there that cannot be done in this world by men of perseverance? Is not the tradition still current that Rama built a bridge over the great ocean itself, by means of monkeys?*

"If I am destined by fortune, to reduce this island under one regal canopy, and to promote the welfare of the state and religion, then indeed, will the commencement of the work see the accomplishment of it also."

Thus did he of great courage, inspire his ministers with courage.

Before the construction of the embankment, however, the profoundly wise ruler of the land made, from the mouth of the embankment, as far as the country of *Rattakara*, a great canal of great breadth and strength, and of many *pórisas*† in depth.

The Protector of the land, having assembled a great many stone cutters, workers in metal, iron smiths and gold-smiths in the country, and having employed them in the work cutting stones, got made by them an embankment of great stability and solidity, having the interstices of the stones

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galla, Dighawatthu, Mandawata, Kuttaggabodhi, Pabbata, Walahassa Mahadaragalla Kumbhilasobbha, Pattapasana, and Kanawapi, as well as many other tanks whose embankments had been in ruins, did the king build (and repair,) ever intent on the welfare of the poor. The ruler of the land having constructed embankments (to prevent inundation) in many rivers, streams, in various parts (of the Island) rendered the country abundant in food. Having also constructed the canal *Tillawatthu*, which had been in ruins, he filled the tank of Manihera (Minnery) with water—(vide 60t chapter of the Maha Wanso).

* I am aware of the existence of another Great Tank bearing the name of *Pandi Colom* in the Uvah district, but being situated in the *Rhuna Ratta* it could think, be scarcely regarded as the *Pando Wapi* of the Maha Wanso, if as I infer from the context, it was constructed during the period, when Prakrama Bahu, was *Mahadi Pado*, or king of Pehiti Ratta.

* In reference to the fable in the Ramayana, that Rama, the conqueror of Rawana, in crossing over from India to Ceylon, caused a bridge to be built over the sea, by his army of Wanaras or monkeys. The reef of sunken rocks which extends across the Gulf of Manar from Ramisseram on the Coast of Coromandel to Talamanar on the Coast of Ceylon, is supposed to be the remains of this bridge.

† "The measure of a man's reach." "Equal to the height, to which he reaches, when elevating both arms with fingers extended." (See Colebrook's Amarakosha, p. 160.)

invisible, like one continued sheet of rock, and having the work of plastering complete.

On the summit of the great embankment, the pious Rajah placed a Bo tree, an image house, and likewise a Dagoba.

The King, by means of this canal, so directed the course of the stream as to make it discharge itself into the sea.

Having cleared the great jungle on both sides of the canal, he formed paddy fields of many thousands of Wahas* of extent, and converted the place in truth into a *Kottabaddaha*, according to the literal meaning of the term, from the fact of its having *Kottabaddaha*† (perpetual granaries,) from the two Pali words *Kotta*, *granary* and *abaddha*, *perpetual*.

Thereafter the King having dammed up the mouths of the rivers *Sankawaddhamáná*, and *Kumbhilawáná*, as far as the *Sukara Nijjhara*‡ (literally Hog cascade, or stream,) and there too, having made a canal, and conducting the water into the tank of *Mahádáragalla*, thoroughly repairing (at the same time) the breaches thereof, including the clearing of the water, courses, (thus) brought into it a larger body of water than it had before, and having formed paddy fields from this place as far as the *Sukara Nijjara* collected paddy.

(*To be continued.*)

OUR REVIEWER.

FIRMINGER'S MANUAL OF GARDENING, for Bengal and Upper India,§ has recently seen its fourth edition, and is this time very carefully and ably revised, corrected and amplified by H. St. John Jackson, late editor of the *Indian Agriculturist*, and for several years Superintendent of the Public Gardens at Jeypore.

This is a most useful and valuable book, supplying all the information that an amateur horticulturist can wish for, and thus it certainly fulfils the intention of its author. The botanical names are also correct. The notes on the cultivation of each genera are really first-class, and it would be hard to improve them, and cultivators will be sure of success if they faithfully carry out these instructions. There is something said about nearly everything that is at all likely to do in the East, and the book is so well arranged that any information one may want is very easy to find.

Firminger's book is an old favorite with Indian residents; the plan of the book in this new issue is somewhat altered and improved. It is divided into four parts, viz., (1) the operations of gardening; (2) the vegetable garden; (3) the fruit garden; and (4) the flower garden. An appendix has been added giving the recent introductions among flowering and ornamental-leaved plants; also new chapters are introduced dealing in considerable detail, with grass conservatories, orchid houses, fernery and propagating frames, with illustrations. The largest additions will be found in part IV., where new chapters are given on Ferns, Orchids, Mosses, Roses, Aroids, Palms and Crotons, &c. The volume consists of 662 pages; the type is clear, and the binding substantial.

The first chapter treats of Climate, Soils and Manures, and this latter subject is treated very fully, the directions about preparation of charred vegetable manure, about the mixture and due proportion of fertilizers, and the relative values of various applications are all practical, and can easily be followed and carried out. Vegetable, mineral and liquid manures are separately treated. In Chapter II. are treated the Laying out of a Garden, Lawns, Hedges, Irrigation, Conservatories, Betel-Houses, Implements, Vermin, &c., &c. The information on the erection of Grass-Conservatories or Betel-Houses may have practical interest for some Colombo residents. We quote from it as follows:—

"Some time ago the happy idea occurred to Dr. Anderson that structures, somewhat similar to those in which the natives of Bengal have from time immemorial grown the Pan, or Betel plant, might be employed with advantage in the cultivation of plants that in nature exist in a climate nearly alike to that in which the Betel thrives. The attempt was made and proved a wonderful success. The structure in itself is a simple and inexpensive thing. On a piece of ground, measured out according to the space required, stout bamboos are driven at intervals, so as to stand erect about seven feet high. To these a lattice of split bamboos is attached, much in the way in which enclosures for fowls are usually made in this country. Over the whole lattice, on the sides as well as the tops, a layer of *Ooloo* grass is bound, just so thin as to allow of an equal proportion of sunlight and shade, producing a kind of subdued light. Stages are then erected, either of brickwork or wood to rest the potted plants upon, with space left for paths around or between them.

"When about to erect a grass conservatory, select a piece of ground away from the shade of large trees. Its length should, if possible, run north and south. The size will depend upon individual taste, and local circumstances and surroundings. 50 feet by 30 feet is a convenient size."

The tat-house is, indeed, already introduced into Colombo, and ferns and sellaginellas thrive well in it; but to those who have not seen them, the hint may be useful. Most interesting are the succeeding chapters on the various ways of multiplying and propagating plants, on cutting, budding, layering, grafting, &c., &c.

On one of the operations of gardening, *i. e.*, Root-Pruning, it is remarked that the Indian practice is the reverse of the English; instead of removing the soil at some distance from the roots, they dig up close around the stem, clear away some of the small roots, and after a week or two fill in with manure and cover over again with soil. The object is to make fruit-trees healthy by keeping their roots near the surface.

Then follows next a calendar of operations for every month in the year for Vegetables, Fruits and Ornamental Plants. And then comes the Vegetable Garden. Every kind of vegetable and of fruit-tree is named, and the due treatment of each is given.

The remaining portion of the book is devoted to the Flower Garden, including Ornamental Annuals, Ornamental Trees, Shrubs and Herb ceous Perennials, a very full list, and the directions for the cultivation of each are complete.

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* According to the Pali Nighandu of Moggallana.

4 Nellis make	1	Lahassa (or Kurunni)
4 Lahas „	1	Drona
4 Dronas „	1	Marika
4 Marikas „	1	Khari (or Amonam)
20 Kharis „	1	Waha

† This is not doubt the *Kotta Vella* of Brook. The Singhalese word *Vella* and the Pali word *Baddha*, both mean, an embankment.

"From *Kotta Vella* to Dastotte, a distance of 9 miles, the country is one of the most delightful I ever recollect seeing on this Island, nearly the whole distance a carriage might drive; there are strong marks of many of the plains and parts of the open country having been cultivated, it abounds in tanks and ravines to facilitate irrigation, all of which are neglected and broken. The reason the inhabitants assign for this, is want of people, and mony to keep them in order (Route from Matelle to Trincomalie, by way of the Ambanganga, by R. Brook Esq.)

‡ Instead of "as far as the Sukara Nijjhara" some MSS. read "the place Sukara Nijjhara." If this be the correct reading, the whole passage might be thus translated.

"Thereafter the King having dammed up, at the junctions of the rivers Sankawaddhamana, and Kumbhilawana, the place (called) Sukara Nijjhara &c."

§ Thacker, Spink & Co., Calcutta, 1890.

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