for the demoralization of the brain of the man of science, especially if it be, as it commonly is, accompanied by business anxiety. And his only way of escape from a predestined break-down is through the monotonous, but interesting occupation of his perceptive faculties in the field, and at his office table. In both he will enjoy that solitude which resembles sleep, in being a medicine for the weary brain. But it is a solitude peopled with unexceptionable friends; in which care sleeps, and pleasure wakes; a solitude in which the soul multiplies itself by alliance with all the possibilities of number, and all the actualities of form; a solitude from which a man returns to the society of his fellow-men, sainted by the blessing of nature, and equal to the duty of existence.

In conclusion, I must express the wish that this meeting of our association may be as delightful and as useful as any that it has ever held. Those who remember how hard we used to work at them, what a harvest of mutual confidences we used to gather at them, and what a glow of fresh enthusiasm we carried away with us from them, will know what such a wish implies. Those who come fresh to this meeting will find themselves made at home in half a dozen worlds of science at once. That is the particular character and special charm of this association, wherein it differs from all local societies, and from all conventions of workers in special branches of science and art. And, as each meeting furnishes a panoramic view of the present state of human knowledge as a whole, so, at each meeting, the old and the young in science are mingled in such friendly and confidential intercourse, that the prospect extends both backwards to the beginnings of inquiry, and forwards to its possible achievements. All good tradition is precious; and so is well-trained current inquiry, and so is sound prophetic calculation. At such a meeting as this, we enjoy the rare privilege of assisting at all three; and, when we scatter to our homes, we can hardly fail to take with us something effectual for lightening and sweetening another year of work.

STANLEY'S KONGO.

FOUR hundred years ago, a Portuguese navigator, sailing along the western shores of Africa, discovered the mouth of a mighty river, which, for many years, was known as the Rio Padrão, or Pillar River, flowing through the kingdom of Kongo. In 1578, however, Lopez described it as the Zaire — a corruption of the native word for river. The Portuguese still call it the Zaire; but English map-makers, since the early part of the seventeenth century, have used the word Kongo as a designation of either the whole or a part of its lower course. There is no good reason for this: but, of all things, geographical names are the least susceptible to reason; and Kongo seems destined to drive out all other appellations, and to spread over the whole course of the river and surrounding country.

The early voyagers confined their explorations to the mouth of the river; and the first attempt, of which we have reliable information, to penetrate inland along its banks, was made by an Englishman, Capt. Tuckey, in 1816. Thirty white men started on this ill-fated expedition: eighteen died almost immediately; and the remainder returned to England, after having been on the river three months, and having explored it for the comparatively short distance of one hundred and seventy-two miles, the greater part of which was by water. This terrible loss of life deterred others from penetrating the unknown regions by the Kongo route. In 1867, however, David Livingstone, travelling westwards from Lake Nyassa, found the Chambezi River, which he afterwards traced to Lake Bangweolo, or Bemba. Thence, under the name of Luapula, it flowed into Lake Mweru, and was met with again at Nyangwe as the Lualaba. Thus much Livingstone had discovered before he died on the shores of Lake Bangweolo. His remains were lovingly escorted to the ocean by his negro servants, and were interred in Westminster Abbey with befitting ceremony. Stanley — then known as the correspondent of the *Herald*, who had penetrated to Lake Tanganika in a successful attempt to find Livingstone — was one of the pall-bearers. Not long afterwards, he strolled into the office of the London *Daily telegraph*. While talking with some of the staff, the editor, Edwin Arnold, entered. The conversation turned upon Livingstone and his work. Suddenly Mr. Arnold, who had been fascinated by the explorer's eye, asked him if he could and would complete the task. As a result of this interview, Stanley reached Nyangwe in October, 1876. He followed the Lualaba to the sea, and proved that the Zaire of the Portuguese, the Kongo of Tuckey and the English map-makers, and the Lualaba, Luapula, and Chambezi of Livingstone, were one and the same river. He then returned to Europe, and soon found himself at the head of an expedition to open the heart of the Dark Continent to the trade of the civilized world *via* the Kongo. These two volumes contain the history of that work.

The estimated length of the Kongo[1] — from its mouth in the Atlantic, to its source in the Chibale Hills, a little to the east of the southern end of Lake Tanganika — is 3,034 miles,

The Congo, and the founding of its free state. By HENRY M. STANLEY, *with illustrations and maps.* 2 vols. New York, *Harper*, 1885. Pp. 28+528, and 10+483. Illus., maps. 8°.

[1] The total estimated length of the Amazon is 4,000 miles; of the Mississippi, 3,160; and of the Missouri-Mississippi, 4,265. — cf. *Imperial Gazetteer*, 1876.

as follows: From the ocean to Vivi, at the head of navigation from the sea, is 110 miles. Thence to Isangila at the upper end of the lower Livingstone Falls is 50 miles. Between Isangila and Manyanga, 88 miles away, the river is 'tolerably navigable.' From Manyanga to Leopoldville, for 85 miles, it pours over the upper Livingstone Falls. Leopoldville once attained, the river can be navigated for 1,068 miles to the foot of the Stanley Falls. Thence to Nyangwe is 385 miles. From Nyangwe to its source — including the lakes — is 1,248 miles. It must be understood, however, that much of this last section of the river has never been explored, and that therefore it may turn out to be longer.

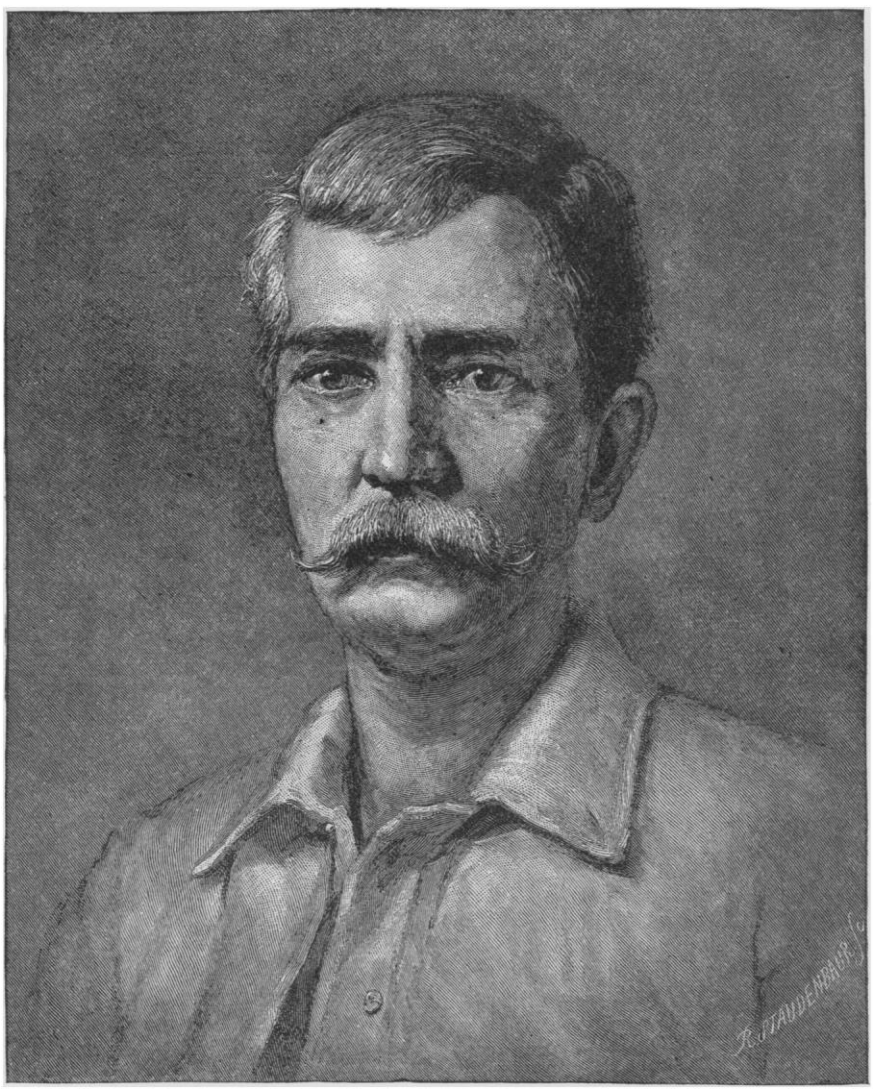
Stanley's first and most difficult work was to open a road around the Livingstone Falls, and to launch two small steamers in Stanley Pool. His force of a little over a hundred men was singularly inadequate to the task; and a whole year elapsed before the first section of the road — from Vivi to Isangila, a distance of fifty-two miles — was constructed, and three steamers dragged over the hills, and put into the river. So great were the difficulties of this undertaking, that it is almost impossible to applaud too highly the resolution and energy of the chief of the expedition. None the less, however, is it to be regretted, that he was compelled to purchase the co-operation of the natives by gifts of ardent spirits. 'It was the custom,' he says, and could not be resisted. Between Isangila and Manyanga, a ferry was established, one of the steamers being employed on that service. With the other two, he pushed on overland again; and the end of the next year found him established at Leopoldville, above the falls. The road-making was over, and Stanley was at liberty to explore the great river and its tributaries as far as Stanley Falls. He discovered Lake Leopold II., and ascended many streams. It was at the mouth of the Biyerre that he first heard of the presence of the Arab slave-traders, whom he came across some distance farther up-stream. They had with them 2,300 slaves, — the spoil of 118 villages, — 'obtained,' to use his own words, 'at the expense of 33,000 lives.' This is probably an exaggeration. But if the Kongo Free State is to be a success, commercially or otherwise, it is evident that slave-hunting, on such an extensive scale at least, must be stopped. Is the International association strong enough to put an end to it?

Stanley estimates the navigable length of the Kongo basin between Leopoldville and Stanley Falls, including tributaries, at 5,249 miles; but much of this estimate is pure guesswork. As an example of this, take the following: "Sixty miles above the Lukanga, we arrive at the fine river Mohindu. We only explored it for about eighty miles; but, considering its magnitude and the native reports, we may estimate its navigability to be about 650 miles!" Are not native reports and magnitude rather insecure data upon which to found such an estimate, especially when the Lubiranzi and the Chofu are impassable twenty-five miles from their confluences with the Kongo? A similar flavor of exaggeration characterizes the whole chapter on the commercial value of the river.

It is perfectly easy to see that the future growth of the Free State depends upon connecting some station on Stanley Pool — probably Kinshassa, as Leopoldville is very unhealthy — with the portion of the river below open to sea-going vessels. Mr. Stanley, therefore, has endeavored to show that such a road could be built, and operated with profit: "As a mere speculation, there is nothing in the whole world offering so remunerative an investment of capital as this small railway." The cost of construction, he argues, at £4,000 per mile, — surely a low estimate, — would amount to only £940,000, with an assured gross revenue of £300,000 per annum. Supposing his estimate of cost and gross revenue to be correct, what would be the net revenue? How could the road be built? By Europeans? They could not stand the climate. By Africans? Where could they be obtained, and how paid? Then, again, could the government of the Kongo State grant a right of way, or would that have to be purchased of the natives at considerable expense? Could that government protect the line against native aggression? Finally, if profitable, would not a rival line be built by the French to Brazzaville, their station on the northen shore of Stanley Pool? — a station, by the way, which is not to be found on Stanley's map. These questions do not seem to have been considered by our author, as they certainly should have been.

An obstacle to the development of the Kongo State, beside which this transportation problem dwindles into insignificance, is to be found in the climate. Take Stanley himself as an example. Assuredly no one will dispute his experience in African travel, nor his energy and resolution. Yet, after one year on the Kongo banks, he gave himself up for lost, summoned his men about him, and prepared to

die. His recovery, at that time, he attributes to a dose of sixty grains of quinine. Two years later he again broke down, and fled to Europe for safety. His European staff numbered from first to last 253 men. Of these, 23 died from sickness, 4 were killed by accident, and 92 returned home. They were all in the prime of life. At first this sickness and intense desire to get away from the deadly river is laid by our author to 'whisky;' next, to 'malingering' and 'sojering.' Finally, however, although without recalling one of the hard words he had written of his subordinates, Mr. Stanley confesses that his principal stations, Vivi, Manyanga, and Leopoldville, were located on very unhealthy sites. They were all on high land, and exposed to the cold winds blowing up-stream from the ocean. Strangely enough, the low-lying stations above Leopoldville seem to have been very healthy. There has been almost no sickness; for instance, at Equator Station, "with a river only five feet



HENRY M. STANLEY (London *Illustrated News*).

below its foundations, creeks sable as ink surrounding it, and the ground unctuous with black fat alluvium." Not a pleasant place to live in, one would say, but healthy, nevertheless. This is a curious condition of affairs, and deserves to be carefully studied by some disinterested person of scientific attainments. In summing up a fifty-page argument, written to prove that the climate is not so much at fault as the individual, Mr. Stanley practically admits the unhealthiness of the whole region. "One more observation," he says, "will suffice. However well the European may endure the climate by wise self-government, years of constant high temperature, assisted by the monotony and poverty of the diet, cannot be otherwise than enervating and depressing, although life may not be endangered. To preserve perfect health, I advise the trader, missionary, coffee-planter, and agriculturist, who hopes to maintain his full vigor after eighteen months' residence, to seek three months' recreation in northern Europe." What a prospect to hold out to the emigrant! Three months out of every twenty-one to be passed away from his business or farm! Would not the expense of such journeyings eat up the profits of the eighteen months of hard work? And how about wife and children? Are the settlers of Kongo State to be bachelors? or are they to be at home only in those three months passed in northern Europe?

Mr. Stanley has not improved as a writer during the last six years. His volumes are full of descriptions of the river and its banks. But they are not interesting, except for the amount of food for thought they contain. His tone, too, towards his understrappers, is very ungracious, to use no harsher term. The maps are excellent, although it is difficult to see why the eastern half of the large map was not extended to the ocean; and a map on a larger scale of the country around the Livingstone Falls should have been added. With a few exceptions, the illustrations are wretched. They will not bear a moment's comparison with those in H. H. Johnston's 'Congo from its mouth to Bolobo.' Only seventeen out of the hundred and twenty-two are stated to have been made from photographs or sketches. The rest seem to have been drawn on demand, so to speak, in London. The wood-engraving, too, is very poor, the pictures having a hard and flat appearance that is unpleasing to the eye; while the flamboyant cover-design of a negress poised on the Belgian coat-of-arms defies description, and must be seen to be appreciated.

NOTES AND NEWS.

— THE Electric power company of New York announce that they have established an electric railway running from Baltimore to Hampden, two and a half miles. The road is very crooked, and the gradients are as high as three hundred and fifty-two feet to the mile. The motor draws a loaded car, carrying sixty-five passengers without difficulty, stopping and starting on the grade without slip of the wheels.

— Mr. Edward Burgess, the designer and builder of the new yacht Puritan, is the secretary of the Boston society of natural history.

— The report in the newspapers of the country of a shower of meteoric stones at Salem, Ind., and the injury by them to buildings and several persons, proves to be without any foundation in fact.

— The Macmillans have just issued an 'Elementary algebra for schools,' the joint work of Mr. H. S. Hall, assistant master at Clifton College, and Mr. S. R. Knight, late assistant master at Marlborough College, — a work which is said to differ in some important respects from the text-books now in use. The same publishers also announced a 'Treatise on differential equations,' by Mr. A. R. Forsyth, Fellow of Trinity College, Cambridge, and an 'Arithmetic for schools,' by the Rev. J. B. Lock, whose works on trigonometry have been favorably received.

— The schooner Rosario, at New York, reports that on June 23, in lat. 29° 14′ N., long. 133° 35′ W., at 11 A.M., two heavy shocks of a submarine earthquake were experienced. These were about one minute apart; and the last was much heavier than the first, causing the vessel to tremble violently. The sky was overcast, and the sea remarkably smooth.

— Among the French species of the genus Polygonum, hybrids are rare in a state of nature; although there are two kinds of flowers, one fertile, the other sterile. In reply to some criticisms upon Gandoger's work on this group, he replies that this fact does not necessarily mark a degradation, but simply a different aptness in fecundation among different flowers; and that, although the absence of fertile grains point toward hybridity, this is not a sure sign.

— As much of recent geographical discovery in Asia has been due, says the *Athenaeum*, to native explorers trained in the surveyor-general of India's department, it will be interesting to place on record a list of the rewards lately granted by the government of India to some of the more prominent of these pioneers of Indian commerce. The most distinguished of them all, A. K., has received the title of Rai Bahadur, and with it a *jaghir* of rent-free land. The explorer known as 'the Bozdar' has been made a Khan Bahadur, and he also has received a grant of land. 'The Meah,' who accompanied Mr. McNair in his journey to Kafiristan, has been rewarded with a sum of money, and the same recompense has been given to A. K.'s companion; while a piece of plate has been presented to Mr. Penny, a planter who afforded the survey-officers much assistance during the Aka operations.