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SCIENTIFIC TRAVELING EXPEDITIONS.

The Woodruff Scientific Expedition, which some months ago was reported to be actively fitting out with a view to departure in October last, has, as our readers are doubtless aware, been postponed, and will not start until some time next spring. Among other claims which the projectors of this scheme put forward was one to the effect that this plan originated with them, and therefore was something quite unique and unexampled in its way. This statement cannot be fully substantiated, inasmuch as the Woodruff scheme is not by any means the only one of its kind. In fact there were like plans projected probably before it was thought of, and there are various others now in existence. As in a round-the-world voyage it matters very little where one starts from, the fact that the other expeditions are to sail from Europe will not militate against their benefits to intending participants on this side of the water. Hence we give a brief summary of the objects and purposes of each of these schemes, in order that our readers, in the interval which must now elapse prior to the departure of the Woodruff vessel, may have an opportunity of making comparisons and a judicious selection of the particular scientific expedition which they will patronize. We use the adjective "scientific," not because the projectors of the schemes other than Woodruff's lay claim to it, as does that gentleman, but rather because it is fully as applicable to their plans as to his.

In England, there are now three expeditions under way, namely, that of Messrs. Cook & Sons, of Gaze and Sons, and of Grindlay & Co. In France there are two, that of La Société des Voyages (joint stock concern), Paris, and that of Captain Radou. In Germany there is one, that of Herr Karl Stangen, of Berlin. In order to consider these scientific expeditions scientifically, they may be classified first with those which do not possess private means of locomotion, but propose to travel by existing means of intercommunication, and second, into those which will possess separate vessels, to be at the disposition of passengers during the entire voyage. Of the six above mentioned, three, Cook's, Gaze's, and Stangen's, schemes belong to the first, and the rest to the second class.

I. Cook's Scientific Expedition.—The firm of Thomas Cook & Sons is so well known as tourists' agents that it is here deemed quite useless to explain their general mode of operations. In fact circulars, etc., in voluminous quantities are obtainable at the office of the concern in this city. To Mr. Cook a round-the-world voyage is a mere bagatelle, and he sells tickets which are good for traveling expenses in Maine or Hindostan, and for hotel charges in Alaska or Australia—or any other parts of the globe the purchaser may desire to visit—so that the traveler has only to make out his own itinerary, and he may pay a sum in gross for the entire trip and go alone; or he may join an expedition, pay so much for the privilege, and have his goings out and comings in regulated per Cook's time table for the period enjoyed. Cook's sixth round-the-world tour left Liverpool on August 25th last, and will return on March 25th, 1878. Price \$1475.

Route same as that of Mr. Phineas Fogg in Jules Verne's "Round the World in 80 days," which see for further particulars. It will be observed, however, that in this scientific expedition out of six months 3½ are spent at sea and 2½ utilized in excursions in the United States and Asia.

2. Gaze's Scientific Expedition is organized on the same plan, but is not to furnish a conductor who travels with the party. Tickets alone are issued good on railroads and steamers over a given route.

3. Stangen's Scientific Expedition.—Stangen used to conduct expeditions for Cook, and knows the business. Participants (we quote from the prospectus) are expected "to belong, without exception, to the best society." The voyage is to last eight months, and the expedition is to depart in May, 1878. Price \$2,930, including a "banquet at the Kaiserhof Hotel, Berlin, of all the members who have taken part in the expedition," when they get back. The route is about the same as that of Cook, that is, across the Atlantic, across the continent, across the Pacific, and then a general skirting of Asia, a journey through the Suez Canal, across the Mediterranean, and so home. Mr. Stangen proposes that he shall have absolute power "to do whatever is necessary for the amusement and instruction of the voyagers." In this respect he surpasses Woodruff. Next we come to Grindlay's plan.

4. Grindlay's Scientific Expedition.—Grindlay intended to depart last April, but analogously to Woodruff he put it to August, and then didn't go. But like Woodruff, he has not renounced the scheme. He has the steamer Sumatra; duration of voyage, nine months; route, coasting along the Mediterranean, through Suez Canal, around Asia, cross over the Pacific to San Francisco, down along the coast of South America, around the Horn, up along the coast again of both continents, and then across the Atlantic. Price \$2,500. Travelers pay their own expenses when ashore. *La Nature*, from which we are taking this information, naively presents three reasons why Grindlay's ship did not sail. First, the Russo-Turkish war; second, because Grindlay wanted fifty subscribers and could not get them; and, third, because five months of the time is spent at sea. The relation of the first is obscure; the rest are amply sufficient.

5. Radou's Scientific Expedition.—Captain Radou wants to take young people around the world and complete their education, for the small sum of \$1,200 each. When it is considered that the vessel is to be propelled only by sails, and is to occupy fifteen months in traversing the shores of North America and British India, besides doubling the Capes of Good Hope and Horn, this sum seems quite moderate. The difficulty with M. Radou's plan is that he thinks sixty travelers can be stowed away comfortably in an 800 ton vessel, which he proposes to buy for \$18,000. He has not gone yet, and fails to state exactly when he proposes so to do.

6. The Society-of-Voyages-of-Study-Around-the-World's Scientific Expedition.—This concern has the advantage of having successfully managed one expedition, and it seems to be the most practical and sensibly organized of all. Its subscription is limited to 66 passengers, but if 30 join the ship sails. Some very influential people in France are giving the plan their support. The price varies according to accommodations. The average charge is \$3,400, but this includes all the expenses of extensive shore expeditions, so that the traveler's actual outlay for the trip proper is not more than \$800. The vessel is a fine fast steamer, and her route lies to the eastward. It embraces the journey through the Mediterranean, the Indian Ocean, Malayan Archipelago, across the Pacific, along both shores of the American continents, and finally across the Atlantic. This expedition will start on June 1, 1878.

THE AMERICAN MACHINERY AND INVENTIONS, WANTED ABROAD.

The State Department is rendering very valuable service to the country by requiring our consuls to report as to the condition of trade at their respective posts, as well as to make suggestions as to the best means of increasing our foreign commerce. Some of these reports bear the mark of being the result of thorough and systematic researches, giving valuable lists of goods that are likely to find a sale, and hints as to the means of developing trade. The system, although in its infancy, has proved very valuable, and our manufacturers are already reaping the advantage of it. We give below a condensation of several of the reports lately received, in hopes that our readers may profit by them and thus, by developing a foreign market for their wares, hasten the approach of the "good time" that seems so long in coming.

The Consul-general at Berlin in one of his reports gives three lists of American manufactures, as follows:

Articles that find ready sale: Fine castings, bronze or maroon-colored; breast drills and wrenches; circular and butcher's saws; try squares, trowels, plumbs, and levels; augers and auger bits; mouse and rat traps; door bolts; cast iron stable fittings; shovels; hickory handles; chisel, file, and auger handles; oilstones and grindstones; padlocks; box scrapers; can openers; gas tongs; mincing knives; shoe brushes; leather; boots and shoes; pressed glassware. Our agricultural implements have long been favorably received, but recently imports of inferior articles have injured their reputation. The following articles are steadily gaining on the market: Hickory wheels, spokes, and wheel rims; windmills; ventilators; steam pumps; gas fittings; portable steam engines; woodworking machinery; cheap clocks; housekeeping and kitchen utensils, especially novelties.

Articles that can be made salable with proper effort: Wood planes, by altering the shapes; wrought iron hinges, by lowering their price; scythes, by conforming to the required shape; machines for making tacks and nails; cheap furniture.

Unsalable articles: Hand, back and panel saws, too high priced to compete with the French, who control the market; draw knives, chisels, gauges, and plane irons, too dear to compete with the English; cooper's tools—not the required shapes; cast iron hinges; harness and horse brushes, too dear; curry combs, too light; sewing machines.

In connection with the last article on the above list, the Consul-general at Vienna makes a novel suggestion as to our patent system to the effect that our laws should be so changed as to allow any citizen the privilege of manufacturing patented articles for exportation to any country where they are not protected, so as to be able to enter freely into competition with foreigners in their own open markets. The consul argues that as under our present system the inventor having the monopoly of a vast home trade is careless of foreign markets and does not care to relinquish any of his large profits to encourage a foreign trade, his product is imitated abroad and sold at a less price, and a trade thus built up which our home manufacturers find it very difficult to compete with after the patent has expired. This has proved to be the case with the sewing machine, the manufacture of which is now so thoroughly developed in many of the German and Austrian cities that the American manufacturers cannot compete with them successfully.

The Consul at Chemnitz, in Saxony, states that, owing to the fact that the majority of the inhabitants of his district are primitive manufacturing peasants, the prospect of doing much trade with them is not very good, yet he thinks there are many American articles that could be sold there, if proper steps were taken to introduce them. Among these may be cited wooden ware, mechanical tools, spun cotton, muslins, calicoes, baking powder, dried and canned fruits, lard, cured meats, butter (at certain seasons), agricultural implements, carriages, harness, and stoves. To introduce these the Consul thinks that merchants and manufacturers, by combining to establish a general depot at Hamburg or Bremen, and employ skilled travelling agents, might build up considerable trade in time.

Our Consul at Cologne advocates a similar style of proceeding to develop trade, and suggests Berlin, Cologne, and Frankfurt as the proper places to establish manufacturers' agencies, inasmuch as Berlin controls the trade of northern Germany, Cologne that of the Rhine and central Germany, and Frankfurt that of the south. It is suggested, however, by the Consul at Leipzig, that as the great spring and fall fairs of that city attract buyers from all parts of Saxony and central Germany, a sample depot of American goods, especially at the spring fair, in charge of a skillful salesman, would do more to open a market for the manufactures of the United States than weeks or months of the scattered efforts of travelling agents. The same gentleman states that a great interest has sprung up in his district since the Centennial Exhibition brought our products to the notice of intelligent German visitors, notwithstanding that the people generally are slow to accept innovations on established usages and are distrustful of foreign importations, yet the little knowledge they have of our manufactures has created considerable inquiry and demand on the part of consumers which the dealers must satisfy. As instances, it is stated that the hardware dealers are compelled to keep many American tools in stock, as they are considered the best; stationers sell our gold pens and knickknacks; shirt makers have to keep American shirting cottons; our silver ware has a high reputation, and one dealer has just successfully introduced our paper hangings.

Denmark being, says our Consul at Copenhagen, a large exporter of agricultural produce, affords a poor market for this class of goods from the United States, with the exception of corn and meal, butter and cheese. The mineral products of Denmark are limited, so that iron and steel and most manufactures thereof have to be imported. All her coal comes from England, and as the prices of coal in England and the United States are about equal, the experiment of supplying the Danish market with American coal could be tested. American butter, although not so good as the Danish, is beginning to rival it; and the Consul thinks that if our dairymen understood the preparation and packing of butter for export as well as the Danish, they would not only command the Danish market, but that of most other countries as well; he therefore suggests that some intelligent American dairyman should visit Denmark to acquaint himself with the Danish practice. American cheese is well liked in Denmark, and its trade could be greatly increased. The same is true in regard to our agricultural machines, sewing and knitting machines, mechanic's tools and implements, leather, cotton, and linen manufactures, leaf tobacco, sugars, molasses, etc. Direct steam communication is recommended as one of the many things necessary to establish this trade.

The Consul at Bristol, England, also advocates the combining of merchants and manufacturers to establish agencies for the sale of such articles of American manufacture or growth as through their superiority or cheapness will be likely to find a market there. He mentions that the main articles of export from the United States to that port are beef, butter, bacon, cheese, canned meats and fruits, flour, grain, oil cakes, oils, sugar, tallow, clocks, melodeons, wooden ware, leather, and some little machinery.

From Leeds, the Department has received a lengthy report which, besides giving statistics of the harvest, importation of wheat, etc., has some additional information relating to our manufactures, from which it appears that the importation of American watches has assumed respectable proportions, with good promise of further development, as they are looked upon as superior to the Swiss, but very little dearer, as equal to the English and very much cheaper—a happy medium, which enables them to sell rapidly. The Consul says he feels assured that a good trade in American shoes could be established in England, if our manufacturers would study the especial requirements of the market, sending nothing but just what the English taste demands. He also thinks that when our wine makers learn how to properly prepare their wines so that they will assume a fixed and stable character, England will purchase largely from us; and suggests that as the English sell vast quantities of what is known as "British spirits," made from our corn, to the wine makers on the continent of Europe for giving additional strength to their wines, that our distillers should manufacture this article and export it direct to the wine producers.

From Japan our Minister writes that there is a fine chance for our manufacturers of cotton goods, as well as woolen cloths and yarns, to introduce their wares. The present market is largely controlled by English houses, but the quality of their goods is inferior to American fabrics, though the prices are the same or higher.

Similar reports come from our Consul at Demarara as to our cotton goods in British Guiana, where it appears that our manufactures are somewhat known, but strange to say, writes the Consul, all the American favorite brands reach the colony through England. Our willow ware, cutlery, tools, leather, boots and shoes, etc., are thoroughly appreciated and command ready sales; but it is thought a much larger trade could be had if we had direct communication by steam, instead of sending the goods through English houses.

From Central America our Minister states that our productions are of a kind that are much sought after there, but that our merchants and manufacturers do not seem to make the same exertions to control trade as do their European rivals. Their price lists are incomplete, their commercial representation imperfectly conducted, their packing more expensive and yet inferior. The German merchants take advantage of this and successfully rival us in the trade of that region, controlling the trade of Central America. They appear to conduct their business more systematically, and their representation is much more efficient from their prevalent custom of sending out young clerks to be educated to the business until they become resident partners.

From Buenos Ayres, the Consul reports that loud calls are being made for the abolition of the discriminating tariff against the United States, which was fixed by a commission of which one of the members was a British merchant in active trade who managed to value American manufactures so high as to make it impossible for them to compete with those of Great Britain. The superiority of our cotton fabrics is fully recognized in the Argentine Republic, and this is the plea for their high valuation. As a result of this the British manufacturers counterfeit by wholesale the brands of favorite American goods, but get them in under the low valuation as British goods, and then sell them in the north as American, so that from the comparatively low price at which these counterfeit American goods are sold, the genuine articles have no chance of being sold.

CUCA AS A STRENGTH SUSTAINER.

In many callings it is occasionally necessary for a man to put forth extra exertion for protracted periods of time; as, for example, a sailor during a storm, a soldier on a forced march, an engineer in case of accident or impending disaster. Frequently, at such times, it is impossible to procure or to prepare suitable food for the increased demands of the system, or to obtain the sleep which both body and mind require. Yet it is desirable, perhaps imperative, that both body and mind shall be kept up to their best working capacity. In every part of the world and in all stages of civilization, men have discovered means more or less efficient, more or less harmful, for meeting such emergencies; and one of the hardest lessons of human life and experience has been to learn how to use such aids to endurance without abusing them. Even the most useful and least harmful of them—tea, coffee, wine, tobacco, and the rest—are mischievous if not worse when used habitually or in excess; while others, like the various alcoholic beverages, are apt to disturb what is so essential in critical emergencies, the proper action of the brain. It is natural and proper, therefore, that those who recognize the practical need of the race for what may be called special foods, should take a lively interest in the demonstration of means for securing the good results aimed at by all of them, with the least possible physical and mental risk. The latest claimant for this responsible position is the leaf so long used by the mountaineers of South America—*cuca*; and perhaps the most instructive test of its virtues thus far made is to be credited to the Toronto Lacrosse Club, a company of intelligent gentlemen, most of them occupying high social and professional positions, and all of sedentary occupation. The latter point is important, since men of indoor life are not the most favorable subjects for occasionally putting forth violent and protracted physical effort; while the matter of intelligence is not less important in determining the value of their estimate of the aid received by the use of *cuca*.

In the spring of 1876 several of the members of the club

began to use *cuca* as a strength-sustainer, with results so satisfactory that nearly all the "first twelve" used the leaves during all their important matches. There were ten in number, and some of them lasted for several hours. The club, it will be remembered, held the championship of the world and maintained it throughout against all comers, Indians as well as whites.

Their practice was to serve out to each man at the beginning of a match about a drachm or a drachm and a half of the *cuca* leaves, to be chewed in small portions during the progress of the game, the saliva to be swallowed. The effect, the experimenters report, was a sensible increase in muscular force and an almost entire exemption from fatigue. The pulse was increased in frequency, and perspiration was augmented; but no mental effect was observed beyond the natural exhilaration of contest and vigorous exercise. There were no subsequent disagreeable effects; and no alkaline matter was used with the leaves, as is the practice in Peru.

On one occasion, in midsummer, the thermometer marking 110° in the sun, a match was played with a club of mechanics and other out-door workers, of sturdy build and in fine condition. The *cuca* chewers came out of the game as elastic and apparently as free from fatigue as when they began, while their opponents were thoroughly exhausted.

The experience of the past season, so far as reported, substantially confirms that of the preceding year. Nearly every member of the club is confident that the *cuca* has been of great assistance in sustaining strength. Two or three are doubtful; not one finds it injurious. It is proper to add that among the South American natives, by whom *cuca* is used with lime and to excess, its effect is often disastrous, imbecility being a common result of its protracted use.

Harvard Observatory.

Professor E. P. Pickering, director of the Harvard Observatory, in his report says that the great equatorial telescope has this year been employed mainly in a new and highly important work—that of measuring the relative brightness of various celestial objects. To effect this, new photometric apparatus had to be invented and adapted to the telescope. Among the most interesting results of the work may be mentioned those derived from a long series of measurements of the brightness of the satellites of Mars discovered last summer by Professor Hall, of Washington. From these measurements it may be inferred with considerable confidence that the diameter of the inner satellite is about seven miles, and that of the outer and smaller satellite about six. Accurate photometric measurements have also for the first time been obtained of other very faint objects, as well as of several planets (including asteroids), satellites, and double stars. Besides the photometric observations of the satellites of Mars, their positions were measured with the filar micrometer by Mr. Waldo, who obtained a series of observations of this kind which is believed to be second only to that made by Professor Hall with the 26 inch telescope at Washington.

The meridian circle has been kept in constant employment by Professor Rogers, who has continued his series of observations of the fixed stars between 50° and 55° north of the celestial equator. This work constitutes the share taken by the observatory in the general revision of Argelander's great catalogue of all the stars of the northern hemisphere visible with small telescopes. Besides these observations, Professor Rogers has made others of an extensive list of the brighter fixed stars, and has determined the apparent places of the planet Mars with respect to the stars surrounding it at the time of its recent opposition.

Many geodetical observations were made by Professor Pickering during the summer, chiefly for the purpose of determining the effect of atmospheric refraction upon the measurement of altitudes. These observations were made with instruments of Professor Pickering's invention, which are very portable, while at the same time they promise to yield results of great accuracy.

Singing Mice.

In *Nature* was recently published an account of a singing mouse. A correspondent of the *SCIENTIFIC AMERICAN* gives us his testimony to a fact which is rare, though as certain as that canaries sing. A few winters since, while one of his family was amusing herself at the piano, a mouse made his appearance on the threshold of the apartment, and, undismayed by the light or the presence of the family, chirped and carolled with intense satisfaction to itself, and to the great delight of its audience. Frequently afterward, but always in the evening, the rare songster repeated his performance. The piano keys were never struck that the mouse did not follow; but when the instrument was not touched, the music from the mouse would come, as if for a reminder. Sometimes the little animal made himself visible and sometimes was hidden in the pantry which, for reasons obvious to housekeepers, he, she, or it had selected as an abode. One evening the mouse was traced to the stairway. Under the carpet sat the little creature, throwing his soul into his song. A lamp was placed beside him, and the family stood and looked and listened for half an hour or more. His head was up, and the movements of the muscles of his throat were plainly visible. Unfortunately our correspondent undertook to capture the singer. Many mice were caught and each was given twenty-four hours grace to sing for its life. But never after the treachery of the trap was the sound of the mouse's carol heard. If caught he died and made no sign.