Science Notes.

The fourth Congress of Criminal Anthropology is to be held at Geneva, Switzerland, under the auspices of the Swiss government, from August 4 to 29 of the present year.

An International Exhibition will be held at Brisbane, Queensland, Australia, during June, July and August, 1897. Special attention will be given to labor saving appliances of all kinds.

The instruments used in the observation of the British Association's committee on earth tremors are so delicate that an angle can be detected which corresponds with that subtended by a chord an inch long of a circle 1,000 miles in radius.

It is recorded that a fully equipped expedition will shortly start for the exploration of the remaining two-thirds of the interior of Australia which the Elder expedition left unfinished. Mr. Albert E. Calvert provided the funds for the expedition.

An aluminum quadrant has been devised to measure the actinic power of the Roentgen rays. The aluminum is arranged in concentric layers varying from one to ten millimeters in thickness. Measurements are made by holding the quadrant between the excited Crookes tubes and a phosphorescent screen or a sensitized plate.

Arrangements are now being perfected in Limoges to celebrate this year the centenary of the introduction of porcelain into France, by means of a retrospective exposition in which the history of porcelain manufacture will be traced. The exposition is being organized by the Société Gay-Lussac, working in conjunction with representatives of the town of Limoges.

A seismological department has been established at the Athens Observatory. It has been placed under the direction of Dr. Papavasilon, who is well known for his investigation regarding the Locris earthquake in 1894. Earthquakes are very frequent in Greece; 34 were recorded in January alone. A monthly bulletin will be published and regular observations will be made over the disturbed area.

Mr. E. D. Fridlander, B.Sc., recently gave an account of some observations of the amount of dust in the atmosphere made at various places during a voyage round the world in 1894-95. The experiments, which were made with a form of Aitken's pocket dust counter, showed that there are often considerable variations in the number of dust particles in a very short space of time. Dust was found up to an altitude of 6,000 feet or 7,000 feet among the Alps, and also in the open ocean so far away from any land as to preclude the possibility of artificial pollution.

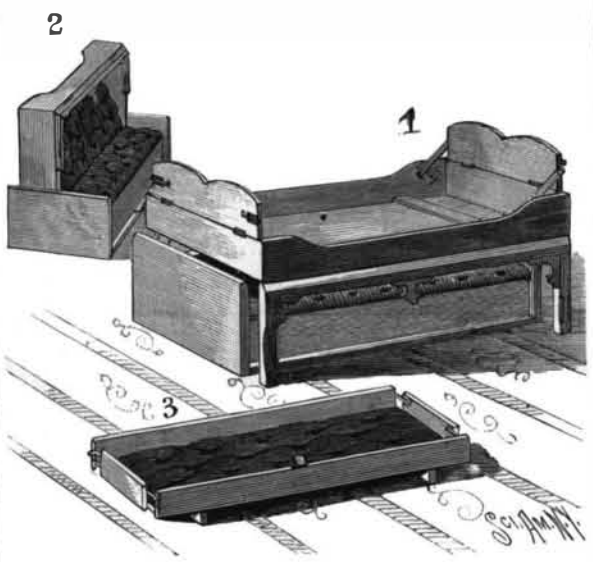
Columbia University will send a party of naturalists under the leadership of Prof. Bashford Dean, to explore Puget Sound. Three zoologists and one botanist will accompany the party. The deep sea work will be done with the Albatross. The region is almost unexplored. The region around Puget Sound is exceedingly rich and promising in its marine and botanical life. The expedition hopes to make extensive additions to the teachers' collections of the university, to add new types to the herbarium and zoological museum, and to collect unique material for research for staff and graduate students and for training in independent marine research. The party will return about the first of September.

In a paper published in the Astronomische Nachrichten Dr. See shows how, by a very ready method, determination may be made of the absolute dimensions of the orbits of bright and rapidly revolving binary stars by single spectroscopic measures of the motions in the line of sight of the component stars, and from the dimensions and other known data of the orbits the actual masses of the stars and their distances from the earth can be easily calculated. But perhaps the most important result claimed for this method is the means it furnishes of testing the question whether the Newtonian law of gravitation applies to stellar systems as well as to the solar system. Dr. See shows the manner in which may be calculated the motion in the line of sight in all parts of the binary orbit, these calculations being based upon the law of gravitation and a single spectroscopic measure. If such measures be continued upon a number of pairs, while the stars complete their revolutions, and the computed and observed motions in the line of sight agree throughout, within reasonable limits of error, it will be strong proof of the universality of the Newtonian law.

One of the most interesting exhibits at the Royal Society's recent conversazione was the series of photographic spectra of the Bessemer flame, as seen at the Northeastern Steel Company's works at Middlesbrough, shown by Prof. Hartley. The photographs demonstrated the presence of gallium, and subsequently this body was separated both from the metal and from the ore of the district. The discovery, in 1876, of the very rare element gallium was the great achievement of Lecoq de Boisbaudran, who obtained it in extremely minute quantities from certain Westphalian zinc blendes. Some of its properties resemble those of nickel, and others those of aluminum: but it has qualities of its own rendering it specially remarkable among the metals. It would be interesting to learn to what extent it is found in Cleveland ironstone. The Westphalian blendes used by Lecoq de Boisbaudran contained, according to Adolphe Wurtz, only one sixty-thousandth of a part of gallium. The element was predicted, with most of its properties, under the name of "ekaluminium," by the Russian chemist Mendelejeff, on the basis of the periodic law.

A COMBINED BED AND SOFA.

The object of the invention shown in the illustration, for which a patent has been granted to Mr. Thomas Langdon, of South Los Angeles, Cal., is to combine in a single article of furniture a single or double bed, a sofa, and a separate, detachable, crib or berth. The device consists of a base to which are attached two stout end pieces, which are connected by a longitudinal partition centrally located between them. The body of the bed is hinged to the top edge of this partition, so that it may be thrown up, to form the back of the couch, or lie down horizontally, when it will rest upon said partition and upon folding legs which are suitably hinged at the front and rear of the bed. A hinged head board and foot board are provided, which are held in position by pivoted braces, and provided with locking bolts, which are controlled by springs and engage suitable holes in the sides of the bed when the same is folded up, thereby holding the clothes firmly in place. The sofa is located in the front compartment of the base, and consists of a cushioned top and hinged sides and ends, which are folded down when it is to be used as a lounge or sofa, the base of the bed being likewise cushioned to form the back of said sofa. If the sofa is to be used as a crib or couch, the front board of the latter is turned upward to form a side rail; and if a second single bed is required, in addition to the large bed, it is formed by taking out the frame of the lounge, turning the end



LANGDON'S COMBINED BED AND SOFA.

and side pieces upward around the cushioned top and latching them into position, the small bed thus formed resting upon two transverse pieces secured to the bottom of the cushion.

A Polar Region Map.

The United States Hydrographic Office of the Naval Bureau has just issued a map which embodies the entire history of North Polar exploration. It is published in two sheets, which divide between them the entire area included in the Arctic circle, and with a marginal belt of four degrees outside it. In other words, the map covers the entire area of North Polar exploration from latitude 62° 30′ north. It is, of course, circular, and is drawn to so large a scale that the diameter of the great circle contained on the two sheets measures forty inches. The longitudes east and west from Greenwich are marked on the Arctic circle, and the latitudes on two great meridian lines which cross the map at right angles from 75° west (nearly the latitude of Washington) and at 165° west. The great circle of Lockwood and Brainard's nearest approach to the Pole, May, 1882, is drawn at 83° 24′ north, and the point where they reached that altitude is marked at 44° 5′ west. The history of every North Polar expedition and exploration of the coasts is indicated by a series of ingenious colored lines and tracings. They can be easily followed, and tell the story with absolute accuracy and in graphic terms. The amount of skilled labor and geographic detail incorporated in the map is enormous, and is saved from being confusing only by the large scale to which the map is drawn. Seventy-six distinct explorations are traced on the map, from Sir John Franklin's, in 1845, down to Peary's, in 1895. Eight nations are represented in these explorations—Great Britain, Germany, Austria, Norway, Sweden, Netherlands, Russia and the United States. The height of the land is marked in feet and the depth of the water in fathoms. The land is colored to a light gray and the water left white. The names on the map are not crowded and are most delightfully legible. The entire lithographic execution of the work is the best. We are at a loss which to pronounce the more admirable, the high degree of perfection reached in the printing or the judgment shown in avoiding unnecessary refinements and the overloading the surface with more names than it could carry clearly, as is done in the recent editions of Stieler. It was a good stroke of practical judgment which divided the entire Arctic circle between two sheets instead of giving it all in one huge, unmanageable sheet, an arrangement whose convenience any one who wishes to consult the maps often will appreciate at once. At the bottom a complete key to all the signs or symbols employed to indicate the polar explorations and expeditions, with the names of the explorers and the dates of their expeditions, is printed out in full. We are proud to see so great a work as this bearing the imprimatur of the United States Hydrographic Office; and, more than all, we are glad to have such a condensed clew map to tell in a few words the confused and confusing story of these heroic expeditions to show what each accomplished, and what the relation of one to the other is and what remains to be done. The map is issued at the low price of one dollar, which, says the Independent, barely covers the cost of publication.

A Trolley Without Poles.

Chemnitz, Saxony, two years ago banished horses from her street cars and substituted the trolley. In a report to the State Department, Consul J. C. Monoghan says one of the principal novelties of the adopted system is that no poles are used. The method of stringing wires is by means of ornamental rosettes fastened into the woodwork or walls of houses, having projecting hooks to which the wires are attached. These hooks are firmly fastened and are tested with seven times the weight they will be called upon to bear. Owners of houses, without exception, preferred to allow the use of their houses free rather than have posts on the sidewalk. The streets through which the cars wind their way are wider than Washington Street, Boston, or Westminster Street, Providence. The railway tracks, in conformity to the law, are level with the pavement, and accidents to vehicles of any kind are rare. The gage is narrower than in America, but the cars keep the track and run as rapidly and smoothly as in the United States. In the heart of the city they run 220 yards per minute, and in the suburbs 330 yards per minute.

The increase of traffic since the introduction of electricity in Chemnitz has been 60 per cent. The cars have no conductors. The motorman is the only person on board who represents the company. By doing away with conductors the company saves 44,000 marks annually. The fare is only ten pfennigs, or a trifle less than 2½ cents, on all routes, including transfers. Should 150,000 persons evade payment in twelve months, the loss would be only 15,000 marks. It would take 450,000 evasions in fare to offset the company's savings by dispensing with conductors' salaries. Among a people who pay for food and drink in restaurants, saloons, and gardens on their honor alone, it is unlikely that the company loses much. Culprits in this regard when detected are punished by having their names advertised in the newspapers as a warning to others. Fare boxes are attached to both ends of the car, so there is no such excuse offered as "difficulty in getting forward."

Experiments are being made in Dresden with storage batteries and underground conduits with a view to replacing the overhead system of railway propulsion in Chemnitz. The overhead trolley system has been very profitable. The system has worked perfectly for the past two years, and has much to commend it to cities bent on an overhead system.

Prompt People.

Don't live a single hour of your life without doing exactly what is to be done in it, and going straight through it from beginning to end. Work, play, study—whatever it is, take hold at once, and finish it up squarely; then to the next thing, without letting any moments drop between. It is wonderful to see how many hours these prompt people contrive to make of a day; it is as if they picked up the moments which the dawdlers lost. And if ever you find yourself where you have so many things pressing upon you that you hardly know how to begin, let me tell you a secret: Take hold of the very first one that comes to hand, and you will find the rest all fall into file, and follow after, like a company of well-drilled soldiers, and though work may be hard to meet when it charges in a squad, it is easily vanquished if you can bring it into line. You may have often seen the anecdote of the man who was asked how he had accomplished so much in his life. "My father taught me," was the reply, "when I had anything to do, go and do it." There is the secret—the magic word now! Make sure, however, that what is to be done ought to be done. "Never put off till to-morrow what you can do to-day" is a good proverb, but don't do what you may regret.—Merchant Sentinel.

Notice.

A premium of $250 is offered by the SCIENTIFIC AMERICAN for the best essay on

THE PROGRESS OF INVENTION DURING THE PAST FIFTY YEARS.

This paper should not exceed in length 2,500 words.

The above-mentioned prize of $250 will be awarded for the best essay, and the prize paper will be published in the Special 50th Anniversary Number of the SCIENTIFIC AMERICAN of July 25. A selection of the five next best papers will be published in subsequent issues of the SCIENTIFIC AMERICAN SUPPLEMENT at our regular rates of compensation.

The papers will be submitted for adjudication to a select jury of three, consisting of—

Prof. R. H. Thurston, Cornell University.

Judge A. P. Greeley, Washington, D. C.

Prof. R. S. Woodward, Columbia University.

Rejected MSS. will be returned when accompanied by a stamped and addressed envelope.

Each paper should be signed by a fictitious name, and a card bearing the true name and the fictitious name of the author should accompany each paper, but in a separate sealed envelope.

All papers should be received at this office on or before June 20, 1896, addressed to

Editor of the SCIENTIFIC AMERICAN,
361 Broadway, New York.

Our Trade with Africa.

The New York Sun told recently of the great increase within a few years in the business of shipping mining machinery from the United States to South Africa. The growth of the general export business to South Africa for the last few years has been correspondingly great, and the increase during this year has been little less than phenomenal. During the year ending with last June the value of the exports was $5,000,000. Such has been the growth of business since then that it is estimated the exports for the year ending with the coming June will be at least $10,000,000. What this means will be seen readily by a glance at the figures for two or three previous years. The value of the exports for the year ending with June, 1894, was $4,122,912; that for the preceding year, $3,500,000; and that for 1892 was $3,400,000.

One reason for the increase of shipments is that now steamers are available for the South African trade. A few years ago the business of southern Africa was either so largely in the hands of the English or in such condition that only sailing vessels plied between here and South African ports. For the last three years steamers have been sent from here, and although no regular line has been in operation, there are firms which send steamers out pretty regularly now at the rate of about three a month. They are tramp steamers and they take cargoes out but do not return.

While comparatively few articles were sent formerly to South Africa from here, now almost every kind of commodity that this country produces is exported. Trade is drummed up, and Americans are pushing their interests vigorously. Only recently the Oregon mill interests have worked their way into the African continent, and steamers are sailing from the north Pacific coast to South African ports. Of course, the great bulk of the shipments from this country are made from the port of New York, but vessels are dispatched also from Gulf ports and others from San Francisco.

The shipments from the South are of wood. All the white pine used in South Africa is sent from this country. The shipments from San Francisco are said to be mainly of wheat. During the present year wheat has formed a very large portion of all the shipments from this country. The reason is that the African wheat crop failed, and the Australian crop was an utter failure.

What the future has in store for the business relations of this country and South Africa would seem to be almost without limit. One of the things which work against the shipping firms is Africa's paucity of good harbors. Harbor improvements are under way there, however, as for example at Port Natal, the port of Natal, where the depth of the channel at the bar was increased from 1882 to 1892 by seven feet and seven inches. The depth in 1892 was thirteen feet eight inches.

What America has to look forward to may be seen from a comparison of the figures of its exports and those of England. America's exports to South Africa were $3,500,000 in 1893 and England's were $46,000,000. The total exports of manufactures from this country last year were in the neighborhood of $200,000,000, or less than half of Germany's, and less than a quarter of England's. Yet American manufacturing plants are capable of turning out twice the amount of goods requisite for the supply of this country in a year. One of the things, not always spoken of as a manufacture, that South Africa got from here is $1,000,000 worth of rum, which was sent out in one year.

Naturally most of the exports for Africa are staples, but some fancy articles, among them bicycles, are being introduced there. A good many medicines are sent over. Everything in the line of cheap wooden furniture is shipped. Agricultural implements are sent in large numbers, mainly of the old fashioned kind, or what are now regarded as old fashioned, although some mowers and reapers are going out. The reason the demand is for wares of the old style instead of the labor-saving machinery is said to be, not that labor is cheap over there, but the farmers prefer to do things in the old way. A good many cheap plows are exported.

An idea of the variety of the shipments made from United States ports to South Africa may be gained by a glance at the manifest of the cargo of a ship now on the water. Among the goods there are lard and lard oil, shoe leather, leather, hardware, lamp goods, codfish, corn, flour, canned meats, axle grease, turpentine, varnish, manufactured wood, barbed wire, doors, handles, parts of plows, axes, cigarettes, canned fruit, baking powder, brooms, carriages, nails, apples, apricots, canned oysters, kerosene, wheat, clocks, medicines, evaporators, hams, stoves, wheelbarrows, dried fruit, sugar, cotton goods of many sorts, spokes and hubs of wheels, lubricating oils, crucibles, ropes, seeds, and iron pipes. One of the commission merchants speaks of having seen many tons of iron pipe loaded for Africa. Besides, there are in the cargo steam pumps and starch, plows, glassware, gloves, curtain fixtures, rubber goods, sporting goods, shovels, mining machinery, furniture and organs, whips, hay, clothing, soap, seeds, cartridges, galvanized oilers, wire mats, oats, lumber, nectarines, candy, can openers, tongues, hay cutters, iron bolts, refined petroleum, books, candles, paraffine wax, suspenders, playing cards, glucose, mail coaches, knives, electrical machinery and supplies, hammocks, paper bags, trunks, exterminators, tomatoes, sirup, white duck, Florida water, windmills, benzine, oil stoves, razor strops, coffee mills, essences, quantities of pain killers, copy presses, iron sieves, picture frames, bird cages, plated ware, watches, dental chairs, dress goods, catalogues, lawn mowers, scales, wooden horses, drugs, typewriters, paper, charts, rye, bicycles, typewriter supplies, lead pipe, paint, roofing, carts, trucks, canvas, canned salmon, feed cutters, and electrotypes.

In many, if not most, of these products there can be no competition between this country and England. Of course, England can send no wheat. In manufactured hardware, the supremacy of American goods is acknowledged. The English goods in this line, it is said, are heavy, without being any stronger than the American, and while the African residents stick by old methods in farming, they like light articles for hand use and for use round their buildings. The exports of doors and sashes and made up wooden ware generally, together with the metal fittings and fixtures that go with these things, are enormous. In structural iron goods the exports are light, which would argue that Africa is not yet anxious to have very tall buildings.

Ordinarily the time of the ship's passage from here to the African ports is about thirty days. It is cheaper to ship freight from here to those ports than from England. The freights are less. One feature of the trade of England and America with South Africa is the difference in their terms of sale. English merchants, the commission houses of this city say, are ready to give six months' credit to the African dealers, whereas American houses draw promptly for all shipments. Many of the African houses have London connections and the financing is done at the London offices, which simplifies matters for a New York firm.

There are said to be about twenty commission houses in New York sending goods to South Africa, and besides these there are, of course, a great many direct shippers, many of the large manufacturing firms making their own shipments. It is not so long ago that Boston did a large part of the shipping done by the United States to South Africa, but now the bulk of it is done from this city.

The steamers call at various ports around South Africa, Mossel Bay, Delagoa Bay, Tamatave, East London, Algoa Bay, Port Elizabeth, Port Natal, Cape Town, and so on. All the way to Delagoa Bay, the port of the Transvaal, the consignments go from here in the one ship. Goods for the Zambesi River country have to be reshipped at Delagoa Bay. English companies run coasting vessels from Port Natal, Delagoa, etc., northward and to Mauritius. Although Delagoa Bay is the port of the Transvaal, Johannesburg is the center toward which all lines of travel converge from the coast points, and it is the objective point for several railroads, although they will be pushed on to Bulawayo, in Matabeleland.

THE Egyptian government has determined to commence a geological survey. The work will be begun this year, and will take about three years for its completion. The estimated cost is $125,000. Capt. H. G. Lyons, R.E., who is at present engaged under the Public Works Department of the Egyptian government in superintending the excavation of the ruined temples of Philæ, will have charge of the survey.

Ravages of the Bicycle Craze.

We extract from an editorial in the Evening Post of June 2, in which the editor argues that the cause of hard times in most industries is owing to the bicycle. Theatrical managers say they have had the poorest season for many years, and that after patient and anxious search for the cause they have found it in the bicycle craze. They say that not only do young men and maidens, but old men and women save up their money in order that with it they may buy wheels. This of itself is disastrous to the theaters, but worse remains to be told; for having bought the wheels they ride on them in the evening instead of going to places of amusement. They ride also on Saturday afternoons, and in Chicago they ride so universally on Sundays that the theaters, which formerly gave successful performances on that day, have discontinued them. The Sabbatarian might find encouragement in this fact were it not true that the churches are suffering almost as severely as the theaters from the same cause.

Business men are as loud in their complaints as the theater managers. The watchmakers and jewelers say they are nearly ruined; that all pin money which the young people saved formerly with which to buy watches and jewelry now goes for bicycles; that parents, instead of presenting a boy with a watch on his twenty-first birthday, now give him a bicycle, and that all the family economy is now conducted with the object of equipping every boy and girl, as well as father and mother, with a wheel. The confectioner cries "me too" to this plaint, declaring that about all the business he does is in chewing gum, ice cream, and soft drinks, while his candies find few customers. The tobacco manufacturer says he is the worst hit of all, since few riders care to smoke on the road—for which there is reason for profound gratitude—and the journals of the trade say it is a fact that the consumption of cigars is decreasing at the rate of a million a day, the total decrease since the craze became general averaging no less than 700,000,000 a year. Instead of sitting idle and smoking most of the day, hundreds of men now ride, and smoke only when they are resting.

The tailor, the hatter, the bookseller, the shoemaker, the horse dealer, and the riding master, all tell similar tales of woe. The tailor says that so many men go about half the time in cheap bicycle suits that they do not wear out their good clothes half as rapidly as formerly. The hatter says so many of them wear cheap caps, in which there is no profit to the maker, that their hats last them twice as long as heretofore. The shoemaker says he is even worse off, for while they buy cheap shoes for the bicycle, they do not even wear these out, and they refrain from walking much in any kind of shoes whatever, so that his loss is almost total. The bookseller says people who are rushing about on wheels, days, nights, and Sundays, no longer read anything, and his business has become practically worthless. As for the horse dealer, stable keeper, and riding master, it is notorious what has happened to them. They are no longer "in it," and, like the horse, are a drug in the market. Even the saloon keeper groans, for he says that while many riders drink beer, the number who take "soft drinks" is much larger, while the number who take "hard drinks" is diminishing, which must be the case in a pastime which cannot be followed with an unsteady head.

But the greatest gainer of all is the American race. An eminent physician is quoted as saying that "not within 200 years has there been any one thing which has so benefited mankind as the invention of the bicycle," that "thousands upon thousands of men and women who till within a few years never got any outdoor exercise to speak of, are now devoting half their time to healthy recreation, are strengthening and developing their bodies, and are not only reaping benefit themselves, but are preparing the way for future generations which will be born of healthy parents." There is no doubt about this. As a people the Americans have never taken sufficient outdoor exercise. We have been a nation of dyspeptics, simply because we did not take sufficient physical exercise to develop and strengthen our bodies. The bicycle is a wonderful builder up and purger of the system. It not only abolishes indigestion and dyspepsia, but rids the system of that curse of middle and old age, rheumatism, and thus adds enormously to the national good nature as well as to the sum of national happiness.

As a social revolutionizer it has never had an equal. It has put the human race on wheels, and thus changed completely many of the most ordinary processes and methods of social life. It is the great leveler, for not till all Americans got on bicycles was the great American principle that every man is just as good as any other man, and generally a little better, fully realized. All are on equal terms, all are happier than ever before, and the sufferers in pocket from this universal fraternity and good will may as well make up their minds to the new order of things, for there will be no return to the old. The true philosopher under the new conditions was the watchmaker of the rural New York village who, when he found the demand for watches falling off, gave up dealing in them and went into the bicycle business.