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## Contents.

(Illustrated articles are marked with an asterisk.)

Atlanta exhibition	273	Patent law, amendments	282
Avalanche of Altels glacier	274	Patents granted, weekly record	284
Axle breaking	275	Pipe lines, wrought iron	275
Beetle, the longhorn	275	Rack, a storing, Puffer's	276
Bicycle notes	275	Railroad across Siberia	274
Bicycling, military	283	Railroading, fast, latest in	283
Birds, the flight of	279	Railway, Trans-Siberian	282
Books and publications new	284	Rust	279
Cannon, 18th century	276	Sawing machines, Long's	276
Cranberries in rhubarb	276	Sawing machine for	276
Electric locomotive, the Balti-	276	Silk industry in India	277
more	276	Smoke prevention on locomotives	278
Electric road, Fair Haven	280	Steam heat and pressure (6646)	284
Fruit market, New York	275	Telephone box, electric road	282
Heavens in November	275	Traction trials in Berlin	278
Horseless carriage contest, the	278	Trial trip of St. Paul	273
Chicago	284	Trolley road, a model	280
Inventions recently patented	284	Water power, long distance transmission of	274
Isles of Shoals, the	274	Water supply, the London	279
Laurel and sassafras, the	279		
Lignite in North Dakota	273		
Pasteur, funeral of	278		

## TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 1035.

For the Week Ending November 2, 1895.

Price 10 cents. For sale by all newsdealers.

I. ACHÆMOLOGY.—The Refuge Tunnels of Naours, France.—Curious remains of primitive people now existing in France.—3 illustrations	16548
II. ARCHITECTURE.—The Halls of Ypres.—A beautiful market building dating back to the early days of Flemish architecture.—1 illustration	16535
III. BACTERIOLOGY.—A Suggestion of a Use for the Rare Metals.—By HENRY C. DEMING.—Application of rare metals for the destruction of bacteria	16545
IV. CHEMISTRY.—Arnold's Patent Economiser.—The application of a continuously indicating specific gravity apparatus to the analysis of furnace products.—1 illustration	16538
Jamaica Dragon's Blood.—By HENRY TRIMBLE.—Chemical analysis of this resin and possible uses of it in pharmacy and technology	16550
Recent Discoveries of Gaseous Elements.—Argon and helium.—Notes on the chemical triumphs of the past year	16544
V. CIVIL ENGINEERING.—Public Hydraulic Power Supply.—Notes on hydraulic power supply in towns, Glasgow, Manchester, Buenos Ayres, etc.—By EDWARD B. ELLINGTON.—Continuation of this exhaustive article on the distribution of power. 23 illustrations	16538
VI. ELECTRIC ENGINEERING.—The Electric Plov in Germany.—By OTTO DOEBERLEIN, United States Consul at Leipzig.—The application of electricity to agriculture as now practically carried on in Germany.—7 illustrations	16542
VII. GEOLOGY.—The Isles of Shoals.—By HORACE C. HOVEY.—An interesting article on this favorite summer resort.—Changes of level of the islands	16547
VIII. METALLURGY.—An Ore Testing Plant.—By H. C. CUTLER.—A recent addition to the apparatus of the University of Minnesota	16537
IX. METEOROLOGY.—Facts About Lightning.—Recent examinations into the efficacy of lightning rods.—Last theories and data	16543
The Ice Avalanche of the Gemmi Pass, Switzerland.—By C. S. DU RICHE PRELLER.—An interesting review of recent avalanches in Switzerland	16550
X. MISCELLANEOUS.—President Faure's Country House at Havre.—A typical French villa, with notes of its furniture, and life of its occupants.—4 illustrations	16535
XI. NATURAL HISTORY.—The Zoological Position of the Trilobites.—A valuable article on this interesting and important form of primitive life	16549
XII. NAVAL ENGINEERING.—Stopping, Steering and Resistance of Floating Vessels.—By JOSEPH R. OLDMAN.—Difficulties of navigation in the Turpentine Industry.—The destruction of the pine forests of America by the use of incorrect methods	16541
XIII. PHOTOGRAPHY.—The Photosphere.—The improved magazine camera described.—2 illustrations	16546
XIV. PHYSICS.—Notes on Electricity.—By JOHN TUNBRIDGE.—Interesting notes on different expositions based on modern theories	16541
On the Phenomena of the Smallest Wave Length.—By VICTOR SCHUMANN.—Application of photography to spectrum analyses	16546
XV. SURGERY.—Remarkable Surgical Operations in Recent Years.—By GEORGE J. MANSON.—A very interesting article from a popular point of view on surgical achievements	16545
XVI. TECHNOLOGY.—Acetylene Gas.—Its properties and its commercial value.—A recent exhibition of acetylene gas, with details concerning it	16544
The By-products of Slaughter Houses.—The importance of by-products in the meat industry; views of a Chicago establishment.—3 illustrations	16537
The Future of the Turpentine Industry.—The destruction of the pine forests of America by the use of incorrect methods	16535
The Gum Benjamin Industry in Siam.—Collection of gum for varnish in the country about Siam	16536
XVII. TRAVEL AND EXPLORATION.—Magellan's Strait.—Notes on this remarkable sea passage, with illustration.—1 illustration	16547

## THE ISLES OF SHOALS.

Attention is called to an interesting article by Dr. Horace C. Hovey, in this week's SUPPLEMENT, announcing recent discoveries concerning the Isles of Shoals. This picturesque group is nine miles from Portsmouth, and includes nine small islands, five of which belong to Maine and four to New Hampshire. Although discovered in 1614 by Captain John Smith, and visited by thousands of tourists, their geology has been neglected. After briefly giving a few historical facts, Dr. Hovey tells what he found during his explorations among the rumpled and twisted rocks of this group. There are proofs that Star, Haley, Cedar and Malaga islands are undergoing a process of elevation, having risen six feet within fifty years. Potholes that once were at tide level and used by the fishermen as basins for cleaning fish are now a hundred feet back from the sea, and six feet above the ordinary tides. The channel between these islands was formerly six feet deeper than it now is. The petrography of the islands has only been partly worked out; but the signs of igneous action are impressive. Dikes of diorite and gneiss and seams of quartz and feldspar run in every direction. The trap rock yields more readily to the action of the sea than do the granitic rocks, and on being worn away leaves channels through which the waves rush with violence. In some cases the work is not yet complete, and the huge basaltic blocks lie like gigantic stairs, thus justifying the etymology of trap from "trappa," meaning steps.

A remarkable column on Appledore Island is described that is eleven feet in diameter, and that must once have been as much as twenty-five feet high, but now has been singularly sliced off by the waves. In shape it is sharply hexagonal. The rock is light colored granite crushed and baked, and protrudes from a mass of black gneiss, beyond which are walls of white granite. It is an altogether unique occurrence.

The violence of the waves that beat about these islands would seem incredible, were not so many proofs at hand. Some of them are given. The Lighthouses, who own most of the islands, built a wall to protect their Appledore hotel. The wall was six feet high and six feet thick. But a single winter storm broke it down and scattered the stones in every direction. Last winter a storm carried great boulders completely across the islands. A boulder weighing many tons was tossed by the waves and lodged on the cliff of White Island fifty feet above the sea level. The lightning has also done its share in the work of demolition. Glacial action has been powerful. These causes combined, glacial, aqueous, igneous and electrical, have rent these islands apart, severed them from the mainland, and comminuted their rocks into the masses of sand now piled up as dunes about the mouth of the Merrimac.

## THE RAILROAD ACROSS SIBERIA.

The Russian government is displaying an activity in prosecuting this great enterprise which makes it certain, not only that it will be completed, but that it will be completed before the date originally arranged.

Before the close of this year the road will be opened as far as the River Obi. It will then be possible in the Old World to take a continuous journey from the Atlantic eastward of over 4,000 miles. It is probable, judging from the present rate of progress, that, by the opening of the twentieth century, a continuous belt of steel will stretch from Paris to the Pacific.

It has already been suggested—and, as the Siberian road approaches the Pacific Ocean, the matter will receive increasing attention—that it would be possible to extend our American system of roads northeasterly to Alaska, to a terminus at Bering Strait on the Pacific.

With a powerful and efficient system of train ferriage across the strait—a distance of say fifty miles—the United States system of railroads would be placed in touch, not merely with that of Siberia itself, but with the whole Asiatic and European system.

Regarding Siberia, it is certain that that country has vast mining and agricultural possibilities, which only need transportation facilities to develop them. In the manufacture of implements and plant for agriculture and mining, the United States are particularly successful. Such a railroad to Alaska, while developing our own territory, would undoubtedly foster a large trade with Asia. China, to the south, must ultimately establish a railroad system; and, when she does, it will merely be a matter of time before she touches the Siberian road to the north and the Indian roads to the south. With an Alaskan road built, every such extension in Asia will lay a new country open to our trade. Freight could then be shipped from New York or New Orleans to Canton, Irkutsk, St. Petersburg, or Paris without breaking bulk.

A railroad to and through Alaska would present engineering difficulties, it is true; but probably no greater than the eleven thousand foot pass on the Rio Grande Railroad, or the famous pass through the Andes of South America.

It is interesting to note that such a scheme, if com-

pleted, would make the circuit of the globe a matter of not more than one month's traveling. Allowing five days from New York to the coast, six days to Bering Straits, fourteen days from Bering Straits to London, and six days from London to New York, it would only consume thirty-one days of twenty-four hours to perform the feat which, only a few years ago, in a daring flight of his imagination, M. Jules Verne suggested might be done in eighty days.

Thus it is that in the arts and sciences the marvels of yesterday become the commonplaces of to-day!

## THE GREAT AVALANCHE OF THE ALTELS GLACIER.

When we speak of the magnitude of the pent-up forces of Nature, the mind can only have a vague sense of the meaning of the words. Occasionally, as in the awful cataclysm that happened some years ago among the islands of the Indian Ocean, or as in the case of this recent fall in the Alps of a whole glacier through some thousands of feet into the valley below, we get a concrete example of what ruin these forces of Nature can work, when once they lose their equilibrium and are violently set in motion.

We publish in this week's issue of the SUPPLEMENT a very interesting contribution to the London Engineering, from the pen of Mr. C. S. Du Riche Preller, describing in detail the fall of the Altels glacier. He analyzes the momentum set up by this immense body of ice as it swept down through a vertical height of nearly a mile upon the doomed valley of the Spitalmatte below. An approximate idea of the magnitude of the forces at work may be formed by considering that this mass of ice, whose bulk was equal to one and a half times that of the great pyramid of Egypt, swept down a mountain side through a vertical height equal to ten times the height of the pyramid, and in so doing acquired a momentum that carried it up some 1,200 feet to the crest of the opposite mountain, before it finally fell back to a state of rest in the valley below.

## LONG-DISTANCE TRANSMISSION OF WATER POWER.

The history of human progress in the mechanical arts is the history of a great struggle between the forces of Nature, active or dormant, on the one hand, and the intelligence of man on the other. No sooner does the mind perceive the magnitude and utility of these forces than it begins to seek out a way to control them. Every new invention marks a further mastery of matter by mind, a more complete subjection of Nature's forces to man's service. Among the many natural storehouses of power that have been drawn upon, perhaps the most available and earliest used was that contained in the rivers and waterfalls. Here was a seemingly boundless supply; and men were quick to avail themselves of it. A glance at the map shows that very often the location of a city has been determined by the presence of available water power. A notable instance of this is the city of Minneapolis, with its world-renowned water-driven flour mills.

But though it is true that, where circumstances permitted it, cities have been built up around a natural source of power supply, it frequently, and more often than not, happens that the particular spot where the fall of water is located, or where the topography of the country favors the impounding of the waters, is ill adapted for the building of a city and the location of factories. In such cases the forces of Nature have been left to run to waste; not because their value was not appreciated, but simply because men knew of no means by which they could utilize them from a distance.

Electricity, the annihilator of space, has solved the problem of transmission; and the water turbine has solved the question of conversion of the stored-up energy of all our streams and rivers. The matter has passed the experimental stage; and there are cities in the United States to-day where the people are transported, lighted, and their factories driven by water power that is located at a distance of many miles, perhaps amid hills or mountains difficult of access.

It is difficult adequately to estimate the benefit that will accrue to this country from the utilization in this way of its vast natural supplies of water power.

Not to mention Niagara, whose possibilities are shown in the successful plant now in operation, it is asserted by experts that Great Falls, Montana, has 268,000 horse power within reach. The Snake River, in Idaho, has three great falls, the American Falls of 50 feet, the Twin Falls of 90 feet, and the celebrated Shoshone Falls of 310 feet. The Grand River in Colorado has been estimated as affording 200,000 horse power. The Colorado River, formed by the junction of the Grand and Green Rivers, flows in great volume and very swiftly for hundreds of miles. By impounding the waters of such rivers as these a power supply could be obtained that would cover all the possible needs of those countries through which they flow.

The States that lie to the west of the Rocky Mountains, and furthest from the sources of coal supply, have been, as was to be expected, the first to avail themselves of the electrical transmission of water power.

Among the earliest instances of this transmission is

the Pomona and San Bernardino supply, which has been in successful operation for a few years. This enjoys the distinction of being "the first long-distance transmission system operated in the United States."

In the adjoining State of Oregon a very fine and successful plant has been in operation for some time at the Falls of the Willamette at Oregon City. The head of 40 feet gives a minimum capacity of 50,000 horse power; and the Portland General Electric Company have now in operation a hydraulic and electric installation of which one-fourth is in operation, which is to have a full capacity, when completed, of 12,800 horse power. The station building, as planned, will have a length parallel to the river of 364 feet. The hydraulic plant consists of Victor turbine wheels, arranged in pairs; each pair consisting of a 42 inch and a 60 inch wheel, running respectively at 200 and 100 revolutions per minute. The larger wheel is to be used during extreme high water as an auxiliary. The power plant will consist of twenty three-phase generators and two direct current generators, acting as exciters. The generators are set upon the floor of the station, the armatures revolving in a horizontal plane. They are over seven feet in diameter and two feet high. The armatures deliver current directly to the line, at a working potential of 6,000 volts effective pressure, without the intermediation of step-up transformers.

With a view to obtaining the best results the company selected the three-phase system of electric power transmission. The current when it reaches Portland, 14 3-10 miles distant, is transformed down to a potential of 400 volts.

In addition to lighting the city, which contains between 70,000 and 80,000 inhabitants, and operating the various motors, the Oregon City plant works an extensive system of trolley lines in the city on the west side of the river. It is proposed to carry the line across the river to East Portland and from there back to Oregon City. The whole plant is giving great satisfaction, and "its operation so far shows admirably, not only the effectiveness of the three-phase transmission system for general service, but also its feasibility."

The latest plant to be put in successful operation was that for the Folsom-Sacramento Power Transmission. By impounding the waters of the American River, and the construction of a complete plant of turbines and electric generators, the city of Sacramento has been furnished with a power and light supply that will meet its needs for many years to come.

The dam on the American River possesses an interesting feature in the shape of a long apron or "shutter," which pivots in a groove extending along the crest. This shutter is raised by hydraulic rams, and thereby the head of water in the river can be at any time increased. The hydraulic equipment consists of four pairs of 30 inch McCormick turbines, of 1,260 horse power each. They run under a head of 55 feet at 300 revolutions per minute; and they are directly coupled to the armature shafts of four 750 kilowatt three-phase General Electric generators. This is claimed to be the largest three-phase dynamo yet built. The height is 8 feet 8 1/2 inches and the base 11 feet by 8 feet 8 inches, and each weighs 59,897 pounds. At the electric power and light station in the city are three 250 kilowatt motors and the various electric railway generators and are lighting dynamos comprising the plant.

The largest consumer at present is the electric railway company, which operates 24 1/2 miles of single and 17 miles of double track.

The Southern Pacific Company, whose railroad shops are situated in the city, are negotiating for 900 horse power, to be utilized in place of their present steam power; and there is a proposal to erect a city drainage plant that shall be electrically driven.

The total length of pole line for transmission purposes is 21 1/2 miles.

#### THE HEAVENS IN NOVEMBER.

Venus, having attained her greatest brilliancy as a morning star on the 25th of October, will continue to withdraw from the neighborhood of the sun until the end of November. Last summer, when she dazzled the eyes of her admirers in the western sky, she was approaching the earth. Henceforth she will recede from it. She passed nearly between the sun and the earth on the 19th of September. At this time, when the two globes were at their nearest approach to one another and when Venus was hidden from the eyes of terrestrial star gazers by the blaze of sunlight surrounding her, the astronomers of that planet had an opportunity to witness the phenomenon of a solar eclipse on the earth. Our globe must then have appeared to them as a much more brilliant planet than Venus ever is for us, and even the moon would be clearly visible to them. Watching with telescopes, they might have seen the moon swinging into line between the sun and earth, and then her round black shadow creeping across the Antarctic snows and the Southern Pacific Ocean.

But some one may say, "What's the use of talking about inhabitants of Venus? Perhaps there are none."

Just so; but then we, ourselves, become, in a cer-

tain sense, inhabitants of Venus when science enables us to place ourselves in imagination upon that planet and to see with the eye of the mind the things that would there be visible. Man does not live by bread alone; neither, if he opens the wings of his intelligence, does he dwell only on the earth.

In regard to the habitability of Venus, I may remark that since I wrote in August last I have talked with the Italian astronomer Schiaparelli at Milan, and he has assured me that his latest observations of Venus absolutely confirm him in the opinion that the rotation of that planet is exceedingly slow, and probably exactly coincident in time with the period of its revolution around the sun. Venus, then (if Schiaparelli is right), has perpetual day on one side and unending night on the other. The bearing of such a condition of things on the question of habitability is too evident to need pointing out, but I have not room to discuss it here. In the meantime Venus as a morning star is worth getting up early to see, even though her splendor is fading.

Nearly at the same time when Venus reached her greatest splendor in October, little Mercury was swiftly passing between the sun and the earth, as if in chase of his greater sister. At the beginning of November a sharp eye might detect him emerging from the rays of the morning sun. The leash of gravitation by which his solar master restrains him is not long enough to permit him to overtake Venus, but on the morning of the 10th he will be at his greatest elongation from the sun, straining, as it were, to break his bonds, and then will be a good time for early risers to catch a glimpse of him.

Mars, Saturn and Uranus are all assembled near the sun in the morning sky in the constellation Libra. Mars and Saturn will be in conjunction on the 16th, an evil aspect, according to the astrologers, since both of these planets are "malefics," and very desperate malefics, too. Let us not, however, be alarmed. The temper of Mars has improved since he has been the object of so much flattering attention on the part of the inhabitants of the earth, while Saturn must surely be too busy keeping his rings of clashing meteors in order to trouble himself about such small affairs as ours.

On the 18th there will be a close conjunction of Mars and the star Alpha Libræ; on the 20th a conjunction of Mercury and Saturn; on the 23d a conjunction of Mercury and Mars, and on the 25th a conjunction of Mercury and Uranus. These conjunctions are certain to play a conspicuous part in the horoscopes of the astrologers, who, some readers may be surprised to learn, did not disappear with the dark ages, but flourish in large numbers to-day, and find thousands of credulous dupes.

Jupiter, near the borders of Cancer and Leo, rises between two and three hours before midnight, during November, and is a brilliant object in the small hours of the morning. His belts of varying shapes and hues are not less beautiful than they were last spring, while the phenomena of his circling satellites are never without interest to the possessor of a telescope.

The month opens with a full moon, the phase occurring on the evening of the 2d in Aries. The moon reaches last quarter in Leo on the evening of the 9th, and becomes new moon in Libra on the 16th about midday, first quarter following in Aquarius early on the morning of the 24th.

The lunar planetary conjunctions occur as follows: With Neptune on the 5th, with Jupiter on the 9th, with Venus on the 13th, with Mercury on the 15th, with Mars on the 15th, with Saturn on the 15th, and with Uranus on the 16th. The moon is nearest the earth on the 13th and farthest from it on the 25th.

Among the double stars that are well placed this month are  $\gamma$  Arietis, the first discovered double, magnitudes 4 and 4 1/2, distance 8";  $\epsilon$  Arietis, magnitudes 4 1/2 and 6, distance 1".5;  $\eta$  Cassiopeæ, magnitudes 4 and 7 1/2, distance 5", colors yellow and purple;  $\tau$  Cassiopeæ, triple, magnitudes 4, 7 and 8, distances 1".5 and 9"; and  $\gamma$  Andromedæ, also triple, although ordinary telescopes cannot at present show the third star. The two principal stars are of magnitudes 3 and 6, distance 10". Their contrast of color, gold and blue, is very decided and beautiful. GARRETT P. SERVISS.

#### The New York Fruit Market.

The first Almeria grapes of the season have arrived, and 1,542 barrels have been sold at the wholesale auction recently. The prices ranged from \$3 to \$6.50 a barrel, the average for the entire sale being \$4.65. This sale is ten days earlier than the first offering of last year. The fruit was not of the best quality, though the prices were high. It is estimated that 90,000 barrels will constitute the total shipments to the United States this year, against 125,000 barrels last season. The only oranges now to be had, excepting a few from Sicily, are those from Jamaica, and the fruit is of fair quality, considering its earliness. Several car load of Albemarle pippins from Virginia have already been shipped from this port to England.

Other American apples now in European markets are Baldwins, Greenings, Kings, Northern Spies and

Ben Davis, the highest grades selling there for \$2 to \$6 a barrel. Although 17,845 barrels of cranberries have thus far reached this city, besides 3,082 crates, twice as many as were received up to the same time last year, the demand for this fruit has been active enough to force high prices. The excessive heat during September is said to have injured the Cape Cod crop, and frosts have more recently damaged the New Jersey cranberry bogs, so that it is estimated that the total yield will not more than equal the short crop of last season. Extra large varieties from Cape Cod command \$8 a barrel.

The season for California fruits is drawing to a close. The last plums, prunes and peaches have been received. Pears are scarce, and will continue to be so during the winter, since much of this fruit has been forwarded to England. One hundred carloads of California fruits have crossed the ocean during the summer and autumn, and Clairgeau, Duchesse, Easter Beurre, Comice and Glout Morceau pears now command \$3.50 to \$5 a box at wholesale in Great Britain; prices for the same sorts here range from \$1.85 to \$3.20 a box. Grapes constituted the bulk of thirty-seven car loads of Western fruits sold in this city recently. Chestnuts, which early in the week sold for \$7.50 to \$8 a barrel, fell to \$4 by Saturday, and hickory nuts were plentiful at seventy-five cents and \$1 a barrel.—Garden and Forest.

#### Cycle Notes.

Bicycles are taxed in Belgium, but the proceeds of the bicycle tax are used for the improvement of the streets and highways.

A number of wheelmen with guns strapped across their backs may be seen speeding over the roads almost daily in the neighborhood of Manchester, N. H. They use the bicycle to reach the outlying woods in quest of game.

In Montreal, Canada, the law provides that every bicycle must be equipped with a brake.

A Chicago inventor has devised a three compartment pneumatic bicycle tire which, while not unpuncturable, still reduces the liability of injury to a minimum, because if the rubber in one of the compartments is punctured, the other two are still sufficient to carry the rider and keep the tire in cylindrical form. The partitions are arranged spirally. The tire is inflated through three separate tubes, each chamber requiring separate pumping.

In many bicycles it is a difficult matter to flush the bearings of the crank shaft with kerosene, owing to the absence of or smallness of the oil hole; they can, however, be admirably flushed in most bicycles by removing the saddle post and pouring kerosene down the frame. The crank shaft should of course be rapidly rotated and the bicycle inclined from side to side.

Women bicyclists of Belding, Or., wear bloomers and a short skirt while riding through the streets of the town, but as soon as they strike the city line they doff the skirt, strap it to the handle bar, and ride unencumbered through the country districts. When they reach the city line on their return, they don the skirt again.

The street railroad companies of Kansas City have decided to allow bicycles to be carried on their cars when the wheelmen have their tires punctured or their wheels otherwise injured so that they would be obliged to walk.

For a long time the Kings County Elevated Railroad, of Brooklyn, has been carrying bicycles, and the road is well patronized by wheelmen, so that sometimes on Sundays special trains are provided for their accommodation. The charge for bicycles is 10 cents.

Many of the Western cities have passed absurd ordinances curtailing the privileges of wheelmen. For instance, one Wisconsin city has passed an ordinance which prohibits riders from leaning their machines against hitching posts.

The first annual convention of the United States Military Wheelmen was held at the Broadway Central Hotel New York City, October 15. The object of holding the convention was to invite all the officers and soldiers and ex-officers and soldiers of the regular or volunteer armies of the United States or of the National Guards of the various States who are wheelmen to meet together and express their views in regard to the utility of the bicycle for military maneuvers.

The spread of the bicycle fever has had a marked effect on the rubber trade. A well known rubber dealer states that in the past eighteen months \$5,000,000 worth of crude rubber has been purchased by tire makers.

An Oregon paper cites an instance of what it considers the crowning act in the degradation of the horse. A man in Dalles owns a horse and also a bicycle, and the bicycle is the latest love. For it he has neglected the horse until the latter has grown fat and lazy for want of exercise. His stableman said the horse really must have exercise, so the owner ties it by a long halter to the handle of his bicycle and trundles along three or four miles a day, leading the horse ignominiously behind him.