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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 346,

For the Week ending August 19, 1882.

Price 10 cents. For sale by all newsdealers.

THE WAR IN EGYPT.

The prospect of a speedy termination of the Egyptian difficulty does not improve. Indeed, it looks now as though England has on hand a serious war which is not likely to be brief, even if no general European complication arises from it.

Meantime the industries of Egypt are grievously deranged; trade is at a stand-still, all manufacturing operations are suspended, and agriculture is largely interrupted.

The geographical and the social characteristics of Egypt are peculiar, and of such a nature that war affects the country far more disastrously than would be possible in any other land.

The Europeans who have been driven out furnished most of the capital for all commercial and industrial enterprises, filled most of the positions requiring scientific knowledge or mechanical skill, and controlled the majority of the means for making productive and profitable the labor of the native masses. In their absence a speedy revival of prosperity is impossible, even if the war should end at once.

Within the past twenty years the agricultural products of Egypt have been nearly trebled by means of the capital and machinery introduced from Europe. The irrigation and consequent cultivation of vast areas of sugar and cotton and corn land have been made possible by the introduction of steam pumps and other modern irrigation machinery. Were the natives able to operate such machinery they can not now do so for lack of coal, and so to a serious extent they cannot produce the crops on which their prosperity depends.

The cotton-ginning factories and steam-presses, by means of which the cotton crop of Egypt has been made fit for profitable exportation, were introduced by Europeans and largely operated by them. The same is true of the sugar mills and the railways and other means of rapid and economical transportation. The natives themselves are incapable of operating the railways or of conducting an export trade, were such trade possible in Egypt in time of war. As a consequence the gathered crops are lying in the interior unsold; cultivation is largely suspended, and thousands of native workpeople are threatened with starvation.

The commercial and industrial arrangements incident to the war are not confined to Egypt. Even if no harm befalls the Suez Canal, and there is no suspension of traffic through it, England cannot but suffer severely, though indirectly, in her commercial and manufacturing interests.

Fully two-thirds of the cotton crop of Egypt, averaging 280,000,000 pounds, has hitherto gone to England. In the Bolton district alone five million spindles are employed on Egyptian cotton; and in the whole of England some twenty-five thousand workpeople are employed upon this staple. The stoppage of the supply cannot but affect them disastrously.

The large dependence of English industry upon Egyptian products is further illustrated in the case of cotton-seed, about nine million dollars worth of which is imported annually. Last year Hull alone took 120,000 tons, and in its crushing twenty-five hundred men and boys were employed. Still more serious will be the effect of the stoppage of the supply of Egyptian cotton seed upon English agriculturists, who depend very largely upon cotton-seed oil-cake for feeding their cattle. The English soap-boilers use about fifty thousand tons of Egyptian cotton-seed oil a year, and must likewise severely feel a cutting off of the supply from that region. England also draws from Egypt annually six or seven million dollars worth of wheat and beans, three million dollars worth of sugar, and more than two million dollars worth of wool, ivory, gums, and other native products.

In return for all these, Egypt has taken manufactured goods, machinery, coal, and cotton fabrics, the producers of which cannot but lose heavily by the ruin which has fallen upon Egypt.

How far these English losses will react upon American trade it is impossible to foresee. The deficiency in cotton and corn can be made good from this side, but it is doubtful if any marked advantage will accrue to American producers unless the war should involve other powers than Egypt and Great Britain.

The first effect anticipated by our shipping merchants is an advance on ocean freight and in marine insurance through the withdrawal of first-class steamers for transport service to the seat of war, and the substitution for them of second and third-class freighters in the regular carrying trade.

A RECENT AURORA.

There was a superb exhibition of auroral light on the night of the 4th of August. We do not know how far over the country it extended, but from an elevated locality among the Connecticut hills the celestial show was beautiful in the extreme. The display commenced about 9 o'clock, when the whole northern sky was illuminated with a light of surpassing softness, singularly colorless and serene in aspect, like the breaking of the dawn on a summer morning, or the silvery light that attends the rising of the summer full moon.

The quiet phase was of short duration. The arch of white light widened and broadened, encroaching on the east and west, and touching the south with delicately penciled rays. The coloring took on bluish and greenish tints. Streams of light darted from the north, north-west, and north-east, reaching to the zenith, and dimming the luster of the bright stars, upon whose domains they ruthlessly intruded. Two brilliant streamers met above Arcturus, surrounding the ruddy star with a transitory corona; others threw their ethereal beams over the Great Dipper, the Polar Star, and Cassiopea, immersing them in a hazy light, through which the stars glimmered and twinkled in subdued brightness. The lesser stars ceased to shine amid the all-pervading glow, and a portion of the Milky Way, grandly defined in the earlier evening, was completely hidden from view.

The scene changed with every glance to the heavens. The streamers dissolved, new ones took their places, waves of brightness undulated over the sky, celestial banners were unfurled, and squares and triangles mingled in the celestial architecture, the varied forms making their rapid course over the sky, now uniting in vast masses, now breaking in pieces, now joining in bands, and now rolling out into vast draperies, with which to curtain the sky. About 10 o'clock the show reached its culmination with a grand finale in the northeast, in which the most brilliant features of the display were concentrated in the closing scene. The light was like that with which in high localities the sun sometimes irradiates a portion of the landscape while the rest is left in shadow. Thus the aurora lighted a hill-side in the distance, and thus this weird agent of the sun threw its beams through the trees in a neighboring pine grove, distinctly outlining their forms and gleaming like sunlight between their trunks and branches. A charming feature of the show was the fall of three meteors from the bowl of the Dipper. The first and third were of the ordinary kind, but the second was as large as a star of the first magnitude, and, as it exploded, left behind a train of crimson light, thus furnishing, for a few seconds, the one element that was wanting to the perfection of the exhibition. For, unlike the grand display of the 16th of April, in which all the hues of the rainbow were represented, the aurora was almost colorless, being white, slighty tinged with blue and green.

At 10 o'clock the moon made her appearance upon the scene, and, though in waning glory, her light was sufficient to break up the brilliance of the show. When, at the latest observation, she was nearly half way to the zenith, the northwestern sky had resumed its normal condition, though auroral banners were still faintly floating in the northeast.

The cause of these auroral outbursts is a question of universal interest. The sun is now passing through the maximum period of sun spots, and a condition of great disturbance agitates his fiery mass. It is generally believed that sun spots and aurora bear to each other the relation of cause and effect. No human being has ever yet found out why a storm in the sun is followed by a display of auroral light in our atmosphere. Nothing in modern astronomy is more desired than a solution of the mysterious relation existing between the sun and his family of worlds. For, doubtless, when our skies are illumined with auroral light, every planet in the system responds to the same all-pervading power. No one knows how many centuries of observation must pass before the key is found to solve the mystery. But, in some unexpected hour, light will break forth from the darkness, and the secret of the sun's physical structure will be comprehended.

FREIGHT CAR COUPLERS.

A correspondent, who has given much serious thought to the question of preventing the slaughter of railway men while making up trains, expresses the opinion that an automatic coupler for freight cars is a mechanical impossibility, so long as the present custom prevails of allowing each car builder or railway company to make the height of the coupling point whatever individual convenience or caprice may dictate.

The use of automatic couplers on passenger cars has been made possible by having the bumpers and coupling centers at the same level on all cars using the same coupling system. Corresponding uniformity in freight cars would make automatic couplings successful with them; and, in our correspondent's opinion, such uniformity of coupling level should be compelled by legislative enactment. He says: "Mine owners are compelled to sink expensive shafts and slopes, and to spend thousands of dollars in other ways, for the safety and health of their men. Why should not one class of men be protected as well as another, and by the same means—legislative—if the humanity or self-interest of employers does not lead them to do it? Once get uniformity in height of bumpers and coupling centers, and the successful automatic coupler will be easily attained, but without uniformity the time of inventors and committees of master car builders, and the money spent in their investigations, will be worse than wasted, for such efforts only delay the pressing of the subject to the vital point—uniformity in height of bumpers and coupling centers, particularly the latter."

Touching the alteration of existing cars, our correspondent says he has never seen any cars with low couplings where any serious mechanical difficulties were in the way of raising the coupling centers to make them correspond with cars having higher coupling centers.

If this opinion is correct the first step toward uniformity would be a general agreement with respect to a standard height for coupling centers for all new cars and all repaired cars which would readily admit of a change to the standard height or to something near it. The diversity which now prevents the use of automatic couplers would thus be gradually done away, at least on the lines which carry the great bulk of the freight of the country, and in whose busy yards most of the coupling accidents occur.

Proposed Change in the Government Academies.

In their scope and spirit the government academies at West Point and Annapolis have given occasion for two serious objections. They are expensive schools, and each has a capacity far in excess of the present needs of the service it is intended to recruit. The national desire is that the army and navy shall be of the smallest dimensions. Both are already over-officered; yet these government training schools are annually graduating large numbers of cadets for whose services there is no demand. The appointment of cadet engineers at the Naval Academy has already been suspended under the provisions of the naval appropriation bill, approved August 5, and there has been serious talk of shutting up the academy altogether. On the other hand, both the Naval Academy and the Military Academy have been charged with a tendency to train up classes of young men to regard themselves as superior to the common run of civilian students. They are officers of the United States Army or Navy, and not to be rated with ordinary work-a-day people who have no ambition above civil life. If this prejudice had the effect of giving the young cadets nobler aims and broader views of their duties and responsibilities, it would be less unpopular; but it does not show itself that way. Hence the disposition of many people to question the utility of supporting the school any longer.

A better view of the situation has been taken by Lieutenant T. H. Stevens. Instead of closing the schools he would have their capacity more completely utilized; and the plan he suggests in the *United Service Magazine* seems to be equally well calculated to correct the tendency to professional narrowness in the spirit of the schools. His plan contemplates the admission to the Naval Academy of a large number of boys who should be at private expense for maintenance, as in private institutions of learning. The number of students should be such as to furnish graduating classes of at least a hundred. From this number he would have a few selected each year for naval officers from among those most fitted for and most desirous of entering the service. A similar plan would answer as well for the Military Academy. In this way, with very little, if any, extra expense the government would help to educate great numbers of young men, who would be valuable as citizens, and who would be in time of war especially well fitted to do good service as volunteer officers. Such an enlargement of the scope of the government schools would do much also to increase their popularity; and by furnishing a larger body of students to select from would enable the government to recruit the military and naval service with a superior class of young officers.

To our mind the advantages of the suggested change would not end here. The reflex effect upon the personnel of the army and navy, in preventing the development of that professional narrowness and conceit so apt to show itself among young men set apart early in life for a special profession carrying authority, and trained exclusively for official position with and by others having the same limitation of life purpose, would be largely prevented in officers educated primarily as civilians. With ties of student friendship reaching out into every department of civil life whither his school fellows have gone it would be impossible for the young officer to become the victim of professional bigotry and exclusiveness. And if the nation should again have occasion to put into the field its citizen soldiery, officered by men drawn from civil life, there would be little risk of seeing repeated the disgraceful and costly exhibitions of professional jealousy which so many "regular" officers showed in our late war toward those who had not been trained at West Point.

Hygiene for Horses.

Dr. C. E. Page gives the *Medical and Surgical Journal* some suggestions on keeping horses in health which are not only in agreement with the best teaching but sustained by his own and others' experience:

"The custom of working or exercising horses directly after eating; or feeding after hard work, and before they are thoroughly rested; baiting at noon, when both these violations of a natural law are committed: these are the predisposing causes of pinkeye, and of most diseases that affect our horses. Keep the horse quiet, dry, warm, and in a pure atmosphere, the nearer outdoor air the better, and stop his feed entirely at the first symptom of disease, and he will speedily recover. It has been demonstrated in tens of thousands of cases in family life that two meals are not only ample for the hardest and most exhausting labors, physical or mental, but altogether best. The same thing has been fully proved in hundreds of instances with horses, and has never in a single instance failed, after a fair trial, to work the best results. An hour's rest at noon is vastly more restoring to a tired animal, whether horse or man, than a meal of any sort, although the latter may prove more stimulating.

"The morning meal given, if possible, early enough for partial stomach digestion before the muscular and nervous systems are called into active play; the night meal offered long enough after work to insure a rested condition of the body; a diet liberal enough, but never excessive; this is the law and gospel of hygienic diet for either man or beast. I have never tried to fatten my horses, for I long ago learned that fat is disease; but I have always found that if a horse does solid work enough he will be fairly plump if he has two sufficient meals. *Muscle* is the product of work and food; *fat* may be laid on by food alone. We see, however, plenty of horses that are generously—too generously—fed, that still remain thin, and show every indication of being under-nourished; dyspepsia is a disease not confined exclusively to creatures who *own* or *drive* horses. But for perfect health and immunity from disease, restriction of exercise must be met by restriction in diet. Horses require more food in cold than in warm weather; if performing the same labor. In case of a warm spell in winter I reduce their feed, more or less, according to circumstances, as surely as I do the amount of fuel consumed. I also adopt the same principle in my own diet. The result is, that neither my animals nor myself are ever for one moment sick."

The Overflow Bug.

The following experience of Mrs. A. E. Bush, of San Jose, California, is given in *Nature*. The insect popularly denominated "overflow bug" in California is the *Platynus maculicollis*, Dej.

"We lived in Fresno county two years, in the northeastern part, and in the foot-hills of the Sierra Nevada. It is hot and dry there; no trees and many rocks where we were; thermometer ranging from 96° to 108° for about three months. In June and July, when hottest and driest, the 'overflow bugs' filled the air between sunset and dark; you could not with safety upon your mouth. They would light all over your clothes; they filled the houses, they swarmed on the table, in the milk, sugar, flour, bread, and everywhere there was a crevice to get through. Take a garment from the wall, and you could shake out a cupful. It was a veritable plague. In a shed where the boards had shrunk, and the cracks been battened, the spaces between the shrunken boards were packed full. They were flying for about two weeks, and then they disappeared mostly, or they did not fly much, but were hidden under papers, clothing, and every available place. In November, before the rains, they spread around but not to fly; make a light in the night, and you would see the floor nearly covered; lift up a rug and the floor under would be black, and they would go scuttling away for some other hiding. I had occasion to take up a floor board after they had apparently disappeared, stragglers excepted. The house was upon underpinning two feet or more from the ground. When the board was raised, there were the overflow bugs piled up against a piece of underpinning, making such a pile as a half bushel of grain would make. They were all through the foot-hills the same, and much the same in Los Angeles about Norfolk, but they did not fly much in the latter place. In Los Angeles they seemed to be worse before the 'Santa Annas,' a hot wind from the desert filling the air with sand; and though the chickens were ever so hungry for insects, they would not eat the overflow bugs You send for a sack of meal, and when you open it you see a handful of overflow bugs; in the night you put up your hand to brush one from your face, and then you get up for soap and water to cleanse your hand. In the morning, if you put on garments without shaking, you get them quickly off and shake them."

Ancient Works in Florida.

The *Travers Herald* describes the finding of an ancient work in the digging a canal between Lakes Eustis and Dora, to open up the more southern lakes of the great lake region of Florida.

The first excavations revealed the existence of a clearly defined wall lying in a line tending toward the southwest, from where it was first struck. The wall was composed of a dark brown sandstone, very much crumbled in places, but more distinct, more clearly defined, and the stone more solid as the digging increased in depth. The wall was evidently the eastern side of an ancient home or fortification, as the slope of the outer wall was to the west. About eight feet from the slope of the eastern wall a mound of sand was struck, embedded in the muck formation above and around it. This sand mound was dug into only a few inches, as the depth of the water demanded but a slight increased depth of the channel at that point; but enough was discovered to warrant the belief that here on the northwestern shore of Lake Dora is submerged a city or town or fortification older by centuries than anything yet discovered in this portion of Florida. Small, curiously shaped blocks of sandstone, some of them showing traces of fire, pieces of pottery, and utensils made of a mottled flint were thrown out by the men while working waist deep in water. One spear head of mottled flint, five and a half inches long by one and a quarter inches wide, nicely finished, was taken from the top of the sand mound and about four feet below the water level of the lake.

Hearing the Aurora by Telephone.

An observer of the recent aurora at Mont Clair, N. J. August 4, writes that on connecting the two poles of his telephone, one with the water pipe leading to cistern near his dwelling, and one with the gas pipe leading all over town, he heard the electrical crackle going on, substantially the same as is heard when the same connection is made during thunder storms. He however reports that the auroral crackle was more delicate in its sound than the thunderstorm crackle, and that beside the crackle there were at intervals of perhaps half a second each, separate short taps on the telephone diaphragm that gave a slight ringing sound.

A CLOCK was exhibited some time ago at Paris which fired a shot every hour. Somebody says that its great practical utility was "to kill time."

The Abatement of Smoke.

The Smoke Abatement Exhibition in London, just closed, was visited by 116,000 persons. The variety of apparatus exhibited was so great that about a thousand applications of the tests were necessary. The tests were conducted by Professors Roberts and Franklin. The chairman of the exhibition committee said when the prizes and awards were distributed that the exhibition had shown that smokeless kitchens were possible and could be fitted to any house. The consumption of gaseous fuel afforded the most promising solution of the problem how to relieve cities from the nuisance of smoke. The committee had decided, if they could find sufficient support from the public, to form an institute, among whose objects would be to promote the better utilization of coal and coal products—to determine practically and scientifically the means actually available for heating houses as at present constructed without producing smoke, by enabling the committee to examine the subject generally and report for public information.

The special Dr. Siemens prize of 100 guineas for the best utilization of coal was divided and awarded to the Dowson Economic Gas Company and the Falkirk Iron Company; the ladies' prize of 50 guineas for the best smoke-preventing coal-burning kitchener was divided between J. F. Constantine and the Eagle Range Company. A resolution to form a smoke abatement institute was adopted.

The Largest Leather Belts.

The largest belt ever made from a single width of hide is said to have just been made by the Jewell company of Hartford for a New York flouring mill. It is forty-eight inches wide, ninety-six feet long and weighs one thousand pounds. —[*Buffalo Express.*

The Hartford *Evening Post* says that the Jewells are now making two still larger belts than the above for one of the largest rubber factories in the country. One is 48 inches wide and 120 feet long, the other is 44 inches wide and 150 feet long, both double thickness. These are the largest belts that can be made from a single hide, as no hide can be solid and thick more than four feet in width. It is but a few years since belts of these proportions could be made, or pulleys on which to run them, and in no country but this is it done now.

The establishment of Messrs. Jewell is one of the most extensive and best organized in the world. In the production of good belting many processes are employed requiring great skill and experience. Those who wish to acquaint themselves with the details of this peculiar industry should examine the series of engravings and descriptions of the Jewell establishment published in the SCIENTIFIC AMERICAN of February 14, 1880.

Baking Powders.

The flourishing condition of the baking powder trade is evident from a glance at the advertising columns of domestic and religious papers. The cause is probably due to the fact that better results are obtainable with them than with their constituents used separately, and why? The best baking powders are made of cream of tartar and soda, mixed in equivalent quantities, some inert substance being added to keep them dry.

The cook or housewife used to buy the ingredients separately and mix them when she used them, and usually the results were satisfactory. As she trusted to measuring them in teaspoons of various sizes instead of weighing them, of course she sometimes got an excess of one or the other, and the bread was either "sour" or brown with soda. But another and worse difficulty arose, for the adulteration fiend invaded the cream of tartar can, and this article became of such uncertain strength that only a prophet could tell how little soda it would neutralize. This went from bad to worse, until some samples were found that contained no cream of tartar at all. This was the golden opportunity for the "baking powder" men, and they improved it well. While some tried to make a cheap article, others preferred to make a good one, and amid charges and counter charges of alum, acid, etc., they have gone on rolling up wealth for themselves, if not for their customers. For those who prefer making their own baking powder we offer the following receipt: Pure cream of tartar, 2 pounds; bicarbonate of soda, 1 pound; corn starch, 1 ounce. All the ingredients must be *perfectly dry* before mixing, and very thoroughly mixed. One teaspoonful is required for one pound of flour. If the materials are not pure, of course the result will not be satisfactory.

Magnesia for Wheat.

The author ranks magnesia along with nitrogen, phosphoric acid, lime, and potash. The proportion of nitrogen and of phosphoric acid increases in wheat from the time of blossoming to maturity. Lime, on the contrary, decreases, and does not seem to play a very important part in the production of the grain, but along with potash serves chiefly in the development of the straw. Magnesia is more important than lime in the formation of grain. The mean requirements of wheat in order to produce 40 hectoliters per hectare are: Nitrogen, 92 6 kilos; phosphoric acid, 37; lime, 25·2; magnesia, 12·2; and potash, 116 2 The "laying" of wheat and other corn is not due to a deficiency of silica in the stalks, but to a diseased condition, consequent on excessive moisture and deficient sunlight.—*H. Joulie.*