A DEFENDER OF LAGER BIER.

MESSRS. EDITORS:—Permit me to say that an article published on page 21 of the present volume of the SCIENTIFIC AMERICAN, under the caption of "What is Lager Bier?" has created no little surprise in unbiased scientific circles. Passing over what belongs to ethics and morals, I ask the privilege of correcting those palpable mistakes which have crept into your statements, so far as chemical data are concerned.

You deny the nutritive qualities of lager bier, although they amount to from 5 to 10 per cent in a well-brewed article. Is there any fermented or other beverage used by the human family which contains comparatively more? You speak of the disappearance of the nutritive constituents of the malt in consequence of its extract being converted, by the fermentation, into carbonic acid gas and alcohol. What does become of the phosphates and alkalies of the malt? Are they all precipitated in the shape of yeast? No; not even the azotes. No reasonable consumer of lager bier has ever fancied to look upon his favorite drink as upon a substitute for food; though it contains enough of nourishing (plastic) principles and less of spirits to make it immensely preferable to any other fermented liquor, even many wines not excepted. That writer who has styled lager bier *the milk of men* has not said too much; for it is similar in constitution to that universal food. If you deduct the small per-centage of alcohol contained in lager bier, you have a diluted milk, spiced by the constituents of hops. "Grain extract," you say, "is not the most fit food for a healthy man;" I admit this assertion to be correct to a certain extent. But since it is an established chemico-physiological fact that the food of man is divisible into two distinct classes, namely, the one which furnishes the *plastic elements* and the one which creates the necessary *animal heat* in the constitution of man, it is self-understood that man cannot live upon any one aliment, but that change and intermixture of nutritive matter is indispensable to feed him well. Among all the victuals, however, which represent both the plastic and heat-creating elements of food, *milk* and *lager bier* come nearest to the point of universal availability. Pure milk presents, in its casein and serum, the azotes, phosphates and alkalies—the plastic elements; its fatty matter constitutes the principle which produces the animal heat in the system of man; while in the lager bier, the malt-extract accounts for the former, and the alcohol for the latter ingredients. All those foods that contain azotes (nitrogeneous combinations), phosphates and alkalies, are classed among the plastic nutriments; while all those foods that are principally made up of fat, starch, sugar and alcohol (carbonaceous matters), belong to the animal-heat-creating kind. The foregoing briefly-stated but scientific facts account for the superiority of milk as *food*, because it is in a liquid state, which renders assimilation most easy; as also for the preference of lager bier as a *drink*, because it contains nourishing constituents in a state of solution.

Your parallel between lager bier and ale is not corroborated by reliable analytical research. In lager bier the alcoholic proportion should never be less than 2·5, and is never higher than 4 per cent. Strong beers as, for instance, ale, porter, brown stout, bock, salvador, &c., contain as much as from 5 to 11 per centof alcohol, The per-centage on extractive matters must be in proportion to the amount of alcohol, or else, whence could the latter come in the course of fermentation? Therefore, while in lager bier the malt-extract figures from 5 to 10 per cent, it is found to the amount of from 5 to 15 per cent in strong beers. But as to the peculiar *modus operandi* resorted to in the preparation of the many different kinds of beer in use, it is universally admitted by all the chemical and medical authorities of note, that the process of making lager bier is—in a sanitary, scientific and technical view—the most correct and satisfactory one.

With regard to the intoxicating qualities of lager bier it is self-evident that, with a person who is accustomed to its consumption, it requires an unusual and unreasonable number of glasses to throw him out of the condition of soberness. If such cases do sometimes happen, it furnishes no reason for a wholesale denunciation of the beverage itself. One thing is indisputably true, however, namely, that not one half the quantity of any sort of strong beer—not to say a word about the generally-beloved sherry, port, brandy and whisky—can be consumed with as much impunity as lager bier. Strong animal and even bestial propensities are (alas!) met with among men in all civilized nations; one fact, however, is firmly established, namely, that less drunkenness is encountered among those people who are chiefly addicted to the consumption of acidulous wines and lager bier than is found among those who are habitual drinkers of ales and spirits. The immoderate use of the most innocent alimentary as well as luxurious compounds and products may be followed by consequences in any one individual which will make us abhor his habits; but this fact can never lead us to a wholesale denunciation of tea, coffee, sparkling waters, fruits, confectioneries, ice-creams, meads, vegetables, wines and beers; for they altogether constitute the nutriments, now-a-days, of civilized humanity. Nothing, therefore, can be more fruitless than to permit a man's ignorance or idiosyncracies to precipitate him into a warfare against any of the acknowledged "institutions" of society, so far as its physical sustenance and comfort are concerned. We have had our tea, coffee, potato, and other wars; but yet the world moved quietly on towards greater and still greater perfection. The lager bier war is at present "all the rage;" nevertheless that drink will fulfill its great moral and social mission against brandy, whisky—in short, against every species of *aqua vitæ*.

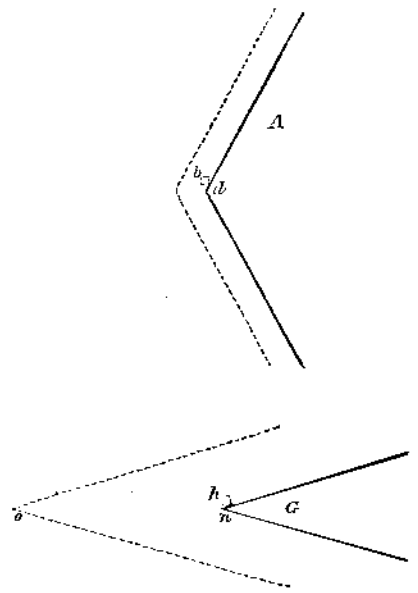
I assure you, Messrs. Editors, that many more arguments could be adduced in behalf of lager bier, recommending it as being a desirable drink in the moral, social and dietetic views of the question; but I will not encroach too much on your valuable space.

CHARLES RIEDEL, PH. D.

New York, July 28, 1860.

THE MODEL OF SHIPS.

The presence of the *Great Eastern* in our harbor has revived the discussion of this inexhaustible subject. Though it is one of the most difficult problems to investigate that has ever been undertaken, there are a few positions in relation to it that are indisputable, and it is important to keep these in mind as the foundation for new acquisitions of knowledge in the matter. The resistance offered to the motion of a vessel, which has to be overcome by the propelling power consists of five elements—the inertia of the vessel, the inertia of the water, the friction of the sides of the vessel against the water, the friction of the particles of water against each other, and the resistance of the air. The inertia of the vessel exists only at starting and while the speed of the vessel is being increased, and the others are all overwhelmed in importance by the inertia of the water. As a vessel is pushed forward in the water, the liquid which occupies the space into which the vessel is moving has to be forced out of the way, and, like all other amtter at rest, it requires a certain measure of force to put it in motion, the amount of force being in direct proportion to the velocity of motion required. Let us observe the action of two bows of vessels, A and G, one of them very blunt and the other very sharp, upon a



cubic foot of water which lies in their path. Suppose the cubic foot of water to be represented by *b* and *h*. In order to move this quantity of water sideways a given distance, say from *b* to *c*, or from *n* to *o*, the blunt bow A, advances only from *d* to *e*, while the sharp bow advances from *n* to *o*. Hence, to overcome the inertia of the water, it will require just the same power to propel the blunt bow, A, from *d* to *e* in a given time that it will to propel, the sharp bow, G, from *n* to *o*, in the same time; that is, if the motion of the water is directly sideways.

But the motion of the water as it is displaced is not exactly sideways, and precisely what the direction of the motion is, and how much water is moved, is a problem which has never been solved, and perhaps never will be. The motion however must be somewhat upward as well as lateral, and there can hardly be a doubt that the principal motion is sideways. In which case other things being equal, the speed of vessels in overcoming their principal resistance would be almost exactly in direct proportion to the sharpness of the bows. We believe all experience confirms this conclusion.

OUR SPECIAL CORRESPONDENCE.

Novel Feat in Engineering; the Swoop of a Locomotive—The Steam Plow in its Right Place—High-pressure Engines and Boiler Explosions to be Abolished from the Western Waters—General Summary and Conclusion.

NEW ORLEANS, La., July 8, 1860.

MESSRS. EDITORS:—On the railroad between Houston and Eagle Lake, in Texas, a feat is performed which, I presume, is entirely unprecedented in engineering. At the crossing of the Brazos river, the road is completed on each side to the bank, and a temporary track laid down each bank and across a temporary bridge, which is some 30 or 40 feet below the level of the permanent road. The design was to cross this bridge, until the permanent one was completed, by letting the locomotive and cars slowly down the bank with ropes, and then hauling them up on the other side. But at one time the locomotive, in descending, broke loose, and, sweeping through the hollow by its momentum, ascended the opposite bank in safety. Since that time the passenger trains are run through the hollow in this manner, sweeping gracefully downward and rising on the opposite side, like the swoop of a hawk on its prey. I have been something of a traveler, but this was the first time that I ever followed a locomotive down the steep bank of a river! It is said that the civil engineers object to this mode of proceeding, on account of the tremendous strain on the road-bed in that part which changes the line of motion from the descending to the horizontal direction.

On the road which is in process of construction from Houston to New Orleans, the steam plow has been used successfully. The land about Houston is very level for many miles in nearly every direction; and after the track was laid across the level prairie, a gang of plows was attached to the locomotive at each side to finish the ditches. An intelligent civil engineer assured me that the work was performed in the smoothest and most perfect manner conceivable. In my opinion, this is the only place in which the steam plow can be used with advantage—in a place where a railroad can be used to run the locomotive on. A steam engine is too heavy to be a practicable power for drawing plows in cultivated fields.

In a pleasant conversation with the remarkably intelligent engineer of the steamer *Texas*—on the way from Galveston to this place—he told me that he had been contending for years, and a number of other engineers with him, that the general idea that the waters of the Ohio and Mississippi rivers were unfit for use in low-pressure engines is all a mistake. He says that a large, fine boat, driven by a low-pressure engine, has been running some few years between Cincinnati and Louisville. I suppose this fact is not new to you, but to me it is one of the most interesting items of intelligence that I have met with for a long time. It seems to me to contain the sure promise of the rapid substitution of low for high-pressure engines on all of our larger rivers, and, consequently, of the cessation of that awful destruction of life which is constantly occurring from the explosion of steam boilers.

Having completed my rapid survey of Texas, I suppose you would like to have the briefest possible statement of its most prominent peculiarities. Texas is a great, beautiful, dry, windy, cotton, cattle, Methodist, live-oak State. B.

NEW wheat from Georgia, Alabama, Missou i and Kentucky has arrived in the market. The b rry is plump and beautiful, and sales of several hundre bushels in one lot have brought $1.50 per bushel.