

with twin engines of the above description, and not only went to Europe, but all through the Mediterranean, returning home without any disaster. The steamship *Golden Age*, having a beam engine of 83 inches diameter and twelve feet stroke, crossed the Atlantic and also circled the globe, completing her achievement without, as the captain tersely remarked, "knocking a chip off her sides."

Enough, however, has been said; the beam engines are not in the minority at sea, by any means; they are to be found in all our waters. A great many of the blockading vessels are fitted with them, and these have proved the fastest in the squadron, and we have never heard complaints from them on account of their engines of any kind. We have been to sea in many different ships; and the beam engines have always been highly popular with engineers, and will, we think, continue to be so for a long time to come.

THE LANCASHIRE DISTRESS--THE PROSPECTS OF THE PEOPLE.

The information which has been published respecting the sufferings of the operatives in Lancashire, England, has excited the generous sympathies of our people, many of whom have made large contributions to relieve the distressed. This is a noble movement. It is the duty of every man, who is able, to assist his fellow man in distress, no matter who he is, or where he may reside. In a question of humanity, all men are brethren. But charity goes further than mere almsgiving. It takes cognizance of present relief with reference to future welfare. The "Good Samaritan" lifted up the wounded man whom he found lying by the wayside, and not only poured oil and wine into his wounds, but carried him to an inn and made arrangements with the landlord for his care until he recovered. Such is the example all men are commanded to follow, and it is to this point we wish to direct public attention for a brief space.

The aged and permanently-disabled poor must and should be objects of charity for life; but the able-bodied poor, who are suffering for want of labor, should be assisted for the present, to overcome a temporary evil in order to secure some mode of helping themselves for the future. It is indeed remarkable that men and women, not only in hundreds and thousands, but hundreds of thousands should be in want of food from lack of employment, when there is so much space in the world for their occupation. Over this the working people of Lancashire have no present control. Their occupation, which was their only estate, has been swept from them by events in which they had no voice and no part. This should not be overlooked, but as it respects the future, the people of England must be held responsible if they suffer without some efficient means being taken to secure them against the recurrence of such calamities. The distress in England has been caused by the war in America. About four millions of people in Great Britain were dependent upon the cotton manufacture when our Southern ports were blockaded; and in 1860, out of 3,366,680 bales of cotton imported from all countries, no less than 2,580,843 were furnished by America. As the cotton manufacture cannot be carried on without the raw material, we can easily conceive how many persons must be out of employment, when about eighty per cent of the raw material furnished annually by the Southern States has been cut off for a whole year. Lancashire is the chief seat of the cotton manufacture for the world. It has a population of about 2,500,000, and Manchester—the cotton metropolis—has a population of about 500,000, mostly engaged in the cotton business. The calamities of our war have reflected in a terrible manner upon these people, and we cannot but feel for them. Lanarkshire, in Scotland, also contains a large population devoted to the cotton manufacture, who are suffering, and though not to the same extent as those in England, still their condition is lamentable. But the important question arises—how long will this distress continue? It is very evident to us that if our civil war continues one, two or several years longer, with the Southern ports blockaded, the people of England will not be able to obtain from other countries one-half of the cotton necessary to keep their spindles in motion. Must hundreds of

thousands of people in that country, then, be supported by charity, perhaps for years? It is unwise, yea the worst sort of charity, to sustain able-bodied men and women as paupers, when new avenues of business or labor may be opened up to them, whereby they may be enabled to provide for themselves. It is long since we formed the opinion that any country which does not raise sufficient food for its people, in ordinary seasons, is in an unfavorable condition for developing the best interests of its inhabitants. Great Britain has been in such a condition for many years, and our war has uncovered to the people the evils of her great manufacturing system. In our opinion, the only true and sure remedy for the English and Scottish working people, who are so dependent upon cotton manufactures, is to emigrate to other lands. There are several British colonies to which they may emigrate and better their condition; but above all, the great Western States and Territories of America offer the most favorable inducements for them. The climate is salubrious and the soil yields in profusion; there they will never be out of work and never suffer from want of food.

Any remedy which does not look to securing such results is futile. Norwegians, Swiss, Danes and Germans have emigrated in colonies to our Western States; they have founded thrifty villages and all have prospered. English operatives should do the same; speaking the same language they will become a homogeneous population with ourselves in a few years. It may be thought that persons brought up to factory life will never become successful farmers; this depends entirely upon themselves. If they are sober, moral and industrious, they will succeed. Several townships in Canada, which were settled by Scottish weavers, have become flourishing agricultural communities; the Lancashire operatives may secure equal success.

It is the duty of the wealthy people of England to assist these people to emigrate and to furnish them with means to overcome the difficulties of getting through the first year. After this they will need no assistance, but will be gradually gaining in ability to pay old debts. Let them come in thousands and tens of thousands. Here they can have free lands and homes for life—

"For Uncle Sam is rich enough to give them all a farm."

OUR USEFUL RECEIPTS.

Much satisfaction has been expressed with the series of useful receipts which has been published weekly in our present volume. It is our intention to continue the practice of furnishing similar information; and, as has been our custom, we shall select from the treasury of practical art only those receipts which are reliable, interesting and of general application. Having access to enlarged sources of information, and being in possession of much practical knowledge, we are enabled to cull and arrange such receipts as are trustworthy. Many receipts which have appeared in our columns have been worth more to thousands of our readers than the price of subscription to the *SCIENTIFIC AMERICAN*. Some of them have cost much labor to secure, and in many instances the substance of whole pages from printed works on chemistry has been condensed into a few lines. We have not merely given that which was old and good, but have searched the most recently-published works on science and the arts, to present the latest discoveries that were applicable to general purposes. As it has been in the past, so shall it be with us in the future; therefore our next volume will contain, in its columns of receipts, all the latest and best information that it is possible to present in relation to the practical arts.

DISABLING GUNS.

The object in spiking a gun is very generally misapprehended by persons unconnected with, and ignorant of, military details. It is not intended to utterly destroy the piece, but to render it useless for the time being, in case the gunners are forced to abandon it. To this end rat-tail files, patent spikes and a variety of different articles are used; these are, in nearly every instance, removed when the danger is past, either by the enemy if they have carried the battery by storm, or by the defenders of the post

themselves if they have spiked the guns on the approach of danger.

It has also been proposed, and indeed practiced in a number of cases, to knock off the trunnions of the cannon either with a sledge or by firing solid shot at them from another gun at close range. Even this does not effectually ruin the ordnance unless the fracture should extend some distance into the reinforcement, as trunnions can be forged upon a hoop and shrunk over the piece, making it as strong as ever. A correspondent suggests that nitric acid be employed to eat away the vent, but as the presence of a bottle of this fluid would be slightly undesirable in an engineer's caisson, and moreover as it is quite useless for the purpose, being very slow in its action upon cast iron, we hardly think it could be satisfactorily used. What is required is an instrument that shall lock up the vent beyond the possibility of removal on the field, and we think this can be done as well by a spike properly made as by any other. Who will invent the best article for the purpose?

THE FORM AND CHARACTER OF PENETRATING PROJECTILES.

It is now a settled fact that it is as necessary to use a specific material for perforating iron plates as it is to give the projectiles a high velocity. A cast-iron shot is so brittle that it breaks into fragments when it strikes a thick iron plate. On the other hand, steel shot when moving at a less velocity than cast-iron shot, pierces thick iron plates without much difficulty. This is one important point settled for the new condition of things in maritime warfare, when ships are clothed with mail.

Another important point is the shape of the projectile. A few months ago only, it was held that smooth-bored guns firing round shot were more destructive to iron-clad vessels than rifled guns, because the velocity of the shot fired by the former is greater than that from the latter. In this case experiments have demonstrated, that rifled guns firing flat-fronted steel bolts exhibit greater penetrating power than round shot. These are important facts.

It is generally understood that Mr. Joseph Whitworth, of Manchester, England, is the inventor of flat-fronted, solid and hollow projectiles, and that he first practically applied them. This turns out to be a popular error. In a letter to the *London Engineer*, Captain Blakely states that the veteran inventor, Captain John Norton, so well known by repute and his communications to the readers of the *SCIENTIFIC AMERICAN*, is the real inventor of this kind of shot, and that he first practically applied it in 1832. While examining one of the old-fashioned arrow heads that were employed by the strong-armed archers of the days of chivalry, he noticed that it was flat-headed, and the idea crossed his mind that this form was adopted for piercing through the coats of mail worn by the warriors of the olden time. Acting upon this idea, he had a hollow steel bolt turned with a flat front, and he charged it like a shell. This was fired with an air-gun against a steel cuirass stuffed with sawdust and powder, at a distance of twenty yards, and it penetrated the cuirass and blew up the gunpowder behind it. This was done in 1832, in the presence of a number of officers at the Life Guards Barracks, Windsor.

The Polytechnic Association--Our Index.

The report of the Polytechnic Association with much other valuable matter is deferred until our next number, owing to the want of space; our columns being largely occupied by the extensive and elaborately-compiled "Index," which will be found to be more ample and comprehensive than any we ever previously published, and will doubtless be highly valued by thousands of our readers who have preserved their numbers for binding.

MR. WILLIAM S. HADLEY, the inventor of the Tap Guide, illustrated in our columns recently, has removed from Philadelphia to Norwalk, Huron county, Ohio. All letters should be addressed to him at that place.

In our next number we intend to illustrate the model sewing-machine manufactory of the Wheeler & Wilson Manufacturing Co., at Bridgeport, Conn.