the force of articulate founds, ſhould have been known to the ancient Greeks, can excite no wonder ; and therefore we eaſily admit the accounts which we read of the horn or trumpet, with which Alexander addressed his army, as well as of the whiſpering caverns of the Syracuſan tyrant. But that the natives of Peru were acquainted with this inſtrument, will probably surpriſe many of our readers. The fact however ſeems incontro­vertible.

In the Hiſtory of the Order of Jeſuits, publiſhed at Naples in 1601 by Beritaria, it is ſaid, that in the year 1595 a ſmall convent of that order in Peru, ſituated in a remote corner, was in danger of immediate deſtruction by famine. One evening the ſuperior Father Samaniac, implored the help of the cacique ; next morning, on opening the gate of the monaſtery, he found it ſurrounded by a number of women, each of whom carried a ſmall baſket of proviſions. He returned thanks to heaven for having miraculouſly interpoſed, by in­spiring the good people with pity for the diſtreſs of his friars. But when he expressed to them his wonder how they came all to be moved as if by mutual agreement with theſe benevolent ſentiments, they told him it was no ſuch thing ; that they looked on him and his countrymen as a pack of infernal magicians, who by their sorceries had enſlaved the country, and had bewitched their good cacique, who hi­therto had treated them with kindneſs and attention, as be­came a true worſhipper of the ſun ; but that the preceding evening at ſunſet he had ordered the inhabitants of ſuch and ſuch villages, about six miles off, to come that morning with proviſions to this neſt of wizards.

The ſuperior aſked them in what manner the governor had warned ſo many of them in ſo ſhort a time, at ſuch a diſtance from his own reſidence ? They told him that it was by the trumpet ; and that every perſon heard at their own door the diſtinct terms of the order. The father had heard nothing; but they told him that none heard the trumpet but the inhabitants of villages to which it was directed. This is a piece of very curious information ; but, after allow­ing a good deal to the exaggeration of the reverend Jeſuits, it cannot, we think, be doubted, but that the Peruvians ac­tually possesſed this ſtentorophonic art. For we may obſerve that the effect deſcribed in this narration reſembles what we *now know* to be the effect of speaking trumpets, while it is unlike what the inventor of ſuch a tale would naturally and ignorantly ſay. Till ſpeaking trumpets were really known, we ſhould expect the ſound to be equally diffuſed on all ſides, which is not the caſe ; for it is much ſtronger in the line of the trumpet than in any direction very oblique to it.

About the middle of the laſt century, Athanaſius Kircher turned his attention to the philoſophy of ſound, and in dif­ferent works threw out many useful and ſcientific hints on the conſtruction of ſpeaking trumpets (ſee Acoustics and Kircher); but his mathematical illuſtrations were ſo vague, and his own character of inattention and credulity ſo noto­rious, that for ſome time theſe works did not attract the no­tice to which they were well intitled.

About the 1670 Sir Samuel Morland, a gentleman of great ingenuity, ſcience, and order, took up the ſubject, and propoſed as a queſtion to the Royal Society of London, What is the best form for a ſpeaking trumpet? which he called a ſtentorophonic horn. He accompanied his demand with an account of his own notions on the ſubject (which he acknowledged to be very vague and conjectural), and an exhibition of ſome inſtruments conſtructed according to his views. They were in general very large conical tubes, ſuddenly ſpreading at the very mouth to a greater width. Their effect was really wonderful. They were tried in St James’s park ; and his Majeſty K. Charles II. ſpeaking in his ordi­nary colloquial pitch of voice through a trumpet only 5 1/2 feet long, was clearly and moſt diſtinctly heard at the diſtance of a thouſand yards. Another person, ſelected we ſuppoſe for the loudness and diſtinctneſs of his voice, was perfectly underſtood at the diſtance of four miles and a half. The fame of this soon ſpread ; Sir Samuel Morland’s princi­ples were refined, conſidering the novelty of the thing, and differ conſiderably from father Kircher’s. The aerial uudulations (for he ſpeaks very accurately concerning the nature of sound) endeavour to diffuſe themſelves in ſpheres, but are stopped by the tube, and therefore redundulate towards the axis like waves from a bank, and, meeting in the axis, they form a ſtrong undulation a little farther advanced along the tube, which again ſpreads, is again reflected, and ſo on, till it arrives at the mouth of the tube greatly magnified, and then it is diffuſed through the open air in the ſame manner, as if all proceeded from a *very* ſonorous point in the centre of the wide end of the trumpet. The author diſtinguiſhes with great judgment between the prodigious reinforcement of ſound in a ſpeaking trumpet and that in the muſical trum­pet, bugle-horn, conch-ſhell, &c. ; and ſhows that the differ­ence consists only in the violence of the first ſonorous agita­tion, which can be produced by us only on a very ſmall ex­tent of ſurface. The mouth-piece diameter therefore of the muſical trumpet muſt be very ſmall, and the force of blaſt very conſiderable. Thus one ſtrong but ſimple undulation will be excited, which muſt be ſubjected to the modifica­tions of harmony, and will be augmented by using a coni­cal tube @@(a). But a ſpeaking trumpet muſt make no change on the nature of the first undulations ; and each point of the mouth-piece muſt be equally conſidered as the centre of ſo­norous undulations, all of which muſt be reinforced in the ſame degree, otherwiſe all diſtinctneſs of articulation will be loſt. The mouth-piece muſt therefore take in the whole of the mouth of the ſpeaker.

When Sir Samuel Morland's trumpet came to be generally known on the continent, it was soon diſcovered that the ſpeak­er could be heard at a great diſtance only in the line of the trumpet ; and this circumſtance was by a Mr Caſſegrain *(Journ. des Sçavans* 1672, p. 131.) attributed to a defect in the principle of its conſtruction, which he ſaid was not accord­ing to the laws of ſonorous undulations. He propoſed a conoid formed by the revolution of a hyperbola round its aſſymptote as the beſt form. A Mr Haſe of Wirtemberg, on the other hand, propoſed a parabolic conoid, having the mouth of the ſpeaker placed in the focus. In this conſtruc­tion he plainly went on the principle of a reflection ſimilar to that of the rays of light ; but this is by no means the caſe. The effect of the parabola will be to give one re­flection, and in this all the circular undulations will be converted into plane waves, which are at right angles to the axis of the trumpet. But nothing hinders their ſubſequent diffuſion ; for it does not appear that the ſound will be enforced, becauſe the agitation of the particles on each wave is not augmented.

The ſubject is exceedingly difficult. We do not fully comprehend on what circumſtance the affection or agita­tion of our organ, or Amply of the membrana tympani, depends. A more violent agitation of the fame air, that is, a wider oſcillation of its particles, cannot fail to increaſe the impulſe on this membrane. The point therefore is to find what

@@@(a) Accordingly the ſound of the bugle-horn, of the muſical trumpet, or the French horn, is prodigiouſly loud, when we conſider the ſmall paſſage through which a moderate blaſt is sent by the trumpeter.