paper before the Epidemiological Society last year on the subject. It is published in the Society's Transactions, and in a separate form by Mr. Lewis, of Gower Street. I also read a paper before the International Congress of Hygiene on antiseptic inunction. In this I have related the experience of other medical men in confirmation of my own. One, whose child had scarlet fever, placed his two other children in the same room, and kept them there for eight days, and they did not take the disease. This will be published in the Transactions of the Congress, and any one interested in the disinfection of infectious diseases, may obtain all the information they require from those two papers.

J. BRENDON CURGENVEN.

Teddington Hall, S.W., August 17.

Alum Solution.

ONE frequently reads, in accounts of experiments on the physical or chemical action of luminous rays, that a *solution of alum* has been used to absorb obscure heat radiations. An instance of this occurs in your description of the investigation by M. D'Arsonval (*NATURE*, vol. xlv. p. 390). I should like to be informed if this practice is based upon actual evidence, or merely upon the supposition that, because alum itself cuts off a larger proportion of heat rays than any other easily available solid, its solution should be more effective than any other liquid. The only figures bearing on the question with which I am acquainted are those of Melloni, and he, as cited by Ganot, states the percentage of heat rays transmitted by alum solution as 12, and that by distilled water as 11. Why, then, not use distilled water?

HARRY NAPIER DRAPER.

Dublin, August 27.

A NEW KEYED MUSICAL INSTRUMENT FOR JUST INTONATION.

ONE of those subjects which periodically turn up for discussion, and then vanish for an interval of neglect, is the possibility of obtaining just intonation in the performance of music. Those who have studied theory, properly so-called, know very well that the series of musical sounds commonly used, as expressed on the pianoforte, do not give the true harmonic combinations on which the art is based, and many zealous attempts have been made to cure the evil. One of these, showing some novelty and much merit, is now exciting the attention of eminent musicians on the Continent; it was mentioned briefly in *NATURE* of April 2 last (p. 521), and it may be interesting to many readers to give some further account of its general features. We may, however, preface this with a few words on the state of the question generally.

Although the equal division of the octave has now taken such a firm hold on modern musicians, it is only within a comparatively recent period that its use has become common. It was well known at an early date, but its defects checked its use until the general introduction of the class of instruments which have culminated in the pianoforte; the reason of its adoption then being that the want of sustaining power in the clavichord and the harpsichord so diminished the discordant effect as to make the faulty tuning endurable. People then began to get accustomed to it, and it was soon found that the system gave such extraordinary facilities for chromatic music, that the cultivation of this style became enormously developed. Hence the chromatic style and the equal temperament have become closely allied, and it is almost a matter of doctrine that the pianoforte division of the octave is a necessary element for the proper performance, or proper understanding, of the compositions of modern days.

For organs, the application of the equal temperament came much later. Down to about the middle of this century they were tuned on a system which gave the most usual keys fairly in tune, at the cost of an occasional harsh chord, which, for church purposes, was considered

but a small price to pay for the general smooth and harmonious effect. But when highly skilled players began to increase, they required the organ to be more used for exhibition, and for this purpose the introduction of the equal temperament was deemed desirable. And so, as it thus commanded the two most powerful sources of music, it crept into use also by stringed instruments, orchestras, and voices, and so it has become general.

The consequence is that, now, practical musicians are in the habit of accepting the equal-tempered intonation as genuine and true music; and as the study of the principles of musical structure is by no means highly encouraged in this country, efforts are seldom made to undeceive them. Students are authoritatively told that questions about just intonation may be interesting to physicists and mathematicians as recondite problems in acoustical science, but that they have no bearing on "practical" music, and that, therefore, musicians need not trouble themselves about them. Some years ago, at a meeting of one of our musical educational establishments, it was said, "We do not here make music an affair of vibrations"—a sentiment which was received with loud applause.

No doubt some enthusiasts have carried the investigations on this subject to a degree of refinement which far outruns practical utility; and one can have little sympathy with those who delight in reviling and despising the duodecimal scale; seeing that it has been the means of materially advancing the art, and that the modern enharmonic system, founded upon it, has been so thoroughly incorporated into modern music that it is difficult to see how it could be now ignored.

But, on the other hand, one must, if one is to exercise reason and common-sense in musical matters, be equally at variance with the party who, arrogating to themselves the title of "practical" musicians, force on us the equal temperament to an extent which really means the extinction of true intonation altogether. We now, indeed, never hear it, and in fact only know by imagination what a true "common chord" means.

The principal objection to this state of things is that the ears of musicians become permanently vitiated, and lose the sense of accurate intonation, or the *desire to approach it*, which is tantamount to abandoning the most precious feature that modern music possesses—namely, beauty of harmony. A chord of well selected sounds, exactly in tune, is a very charming thing; but it is a thing unknown to ears of the present day. I can recollect the time when singers and violin-players strove to sing and play in good tune, and the effect of such unaccompanied part-singing, and such violin-playing, was very delightful. But now, music not being made "an affair of vibrations," one is often ashamed of the quality of what one hears; nobody seems to think purity of harmony, either with voices or violins or orchestras, to be a matter worth striving after.

It is surely a reasonable wish that this should be checked, but one must be reasonable in one's expectations. The pianoforte must certainly be let alone, and so must the organ when used for exhibitional purposes, though its cacophony under the present tuning detracts much from the pleasure of hearing such fine playing as is now common. But vocalists and violin-players ought to be encouraged, as of old, to sing and play in tune, and for this purpose what is wanted is an instrument which will keep up and circulate the tradition of what true music means. To attain this, therefore—*i.e.* to construct an instrument which shall enable a player, with moderate ease, to play polyphonic music, of moderately chromatic character, in strict tune—has been the aim of many ingenious musicians and mechanics.

I need not go into history. Everybody may see at South Kensington the wonderful enharmonic organ, built half a century ago by General Thompson, and may read of