

not only pneumatic action for the keys, but a pneumatic stop action which admits of an exceedingly convenient composition pedal arrangement. The pedal on being pressed and hitched down draws its corresponding set of stops, and shuts them off again when allowed to rise, without interfering with any arrangement that has already been made. There is also an electric solo organ, but it was out of order when I tried the instrument. There is a concert organ by the same makers in Boston with a set of composition pedals, each with a complete set of draw-stops, which can be arranged beforehand, and come into use when the pedal is pressed. I believe the new Riga organ is electrical.

Mr. Hope-Jones has recently paid great attention to the subject of electric actions. Being an electrical engineer and an organist, he is well fitted for tackling such a difficult subject. There is given above an illustration of the console of the organ of St. John's Church, Birkenhead, where Mr. Hope-Jones is organist. Instead of draw-stops at the sides of the player there are rows of little tumblers just under the music. A touch at the top or bottom puts the stop in or out. This organ, if arranged in the ordinary way, would have about forty draw-stops. By the use of electric gear, Mr. Hope-Jones produces an organ which has the same effect as an instrument of fifty-three with the ease of manipulation of one of twenty draw-stops. In addition, it has a whole host of composition buttons, crescendo arrangements, and other accessories.

So far electricity seems to have been used to work an air relay only. The use of electricity may easily be carried very much farther than this. The difficulty has been the supply of electrical energy, and batteries have been used. Mr. Hope-Jones, who has had experience in telephone work, has probably reduced the energy needed to a minimum. It seems obvious, however, that to use electricity to work an air relay for working a valve needing a pull of a pound or two through half an inch is absurd; and our electrical readers may well study the question, as given, say, twenty watts available, the whole mechanism of the ordinary organ might be swept away, and an infinitely more convenient and much less costly instrument devised. It is easy to get the power. In England the blower, who does the whole of the work when air relays are used, works a thing like a pump handle up and down. In France he works two levers with his feet. Sometimes the blower is a water motor or a gas engine. All that is wanted is rotary motion. Even if rotary motion is provided, by means of hand cranks, water motors, or gas engines, the feeders are generally on the principle of a smith's bellows. We would suggest that such a machine as the Baker positive blower would be very much cheaper and better, giving a uniform supply without beating. The electric power can then be supplied by a very small magneto machine. This need have no commutator, it may supply alternating currents of low enough frequency to be silent. There is then nothing to get out of order, and owing to hysteresis, if closed circuit electromagnets be used, there is practically no sparking at the various contacts. Organ music is limited entirely by the mechanism of the organ and develops with it. In Germany they have only one sort of organ music, of which the works of Merkel, Rheinberger, and perhaps Mendelssohn may be taken as examples. This needs no accessory mechanism, and even modern German organs have, we believe, little as a rule. The well known organ at Tyne Dock, by Schultze, has no composition pedals, and, if I remember aright, no couplers. In France the organ intersperses showy scraps during church service; and many of the organs are not designed for solid playing. The large organ at St. Eustache, for instance, has

the pedals so arranged that the player cannot reach them without sliding along the seat. They have all sorts of arrangements for meretricious effects—tremulants, fancy reeds, and "effets d'orage." In England and the United States organ playing has got as far as it can without a change in organ construction. The average church organ spends its time in the monotonous accompaniment of hymns and chants, but the concert instrument plays German fugue music, German chorale organ music or the resulting German organ sonata; then it plays Guilman and light French music; and then it indulges in a development which is essentially English, the organ arrangement. As much of an orchestral movement as can possibly be compressed into the region of ten fingers and two feet is crammed on three staves, and the organist has to change his stops as best he can. It is probably only in England and America that such things as the overtures to "Der Freischütz" or "A Midsummer Night's Dream" are played on organs. It is only because the mechanism does not give the right combinations quickly enough, if at all, that the overture to "Tannhäuser" does not figure on recital programmes.

It is difficult to think of all that can be done easily and cheaply by direct electric mechanism. If each key makes circuit with a set of small electric valves, one to each pipe, and if the returns to each stop are controlled by what corresponds to the draw-stop, all the ordinary mechanism of pneumatic pallets, expensive sound-boards—which sometimes warp—trackers, sliders, rollers, &c., may be swept off. It may be remarked parenthetically that the abolition of pneumatic pallets is itself most desirable. Apart from expense, they tend to develop a bad style of playing. The organ cannot accent a note by playing it louder, so emphasis is given to it by clipping the note before it a little short. Phrasing thus depends on perfect instantaneousness of the action which is not always found with the air relay. In a cathedral, organ music gets mixed up into a sort of roar which rolls down the aisles in a way poets like, and slovenly phrasing does not matter, but in a concert room an organist accustomed to a large instrument generally bears evidences of it. With electric mechanism, any stop may be drawn on any manual, or prearranged for any manual and composition button. Any grouping may thus be adopted. In orchestral music, though there are about twenty staves in the score, the instruments fall roughly into a few groups. It should be easy to group the corresponding stops on the organ in the same way for playing orchestral music. This can be done by electricity. Again, in playing from the ordinary piano score of oratorios, there are four lines of voice parts, which demand one keyboard, and two lines of condensed accompaniment, which demand one or two keyboards, which must be coupled instantly to the voice keyboard when there are no hands available to play them. Existing organs generally meet these last requirements. Electric action admits of still another development. In a medium sized hall, one manual may be an ordinary grand piano. A piano could not be combined with an ordinary organ, because the touch is different; but if the console is detached from the organ so as to give breathing room for the piano, the addition of the contacts to the keys will not interfere with the touch of the piano at all. This suggestion will strike many as odd, some may say barbarous, but the harp may almost be considered part of the modern orchestra, and apart from concertos, the piano might also be absorbed too, especially if it were more portable, and several could be employed together.

Enough has been said to show the enormous advantages of simple organ mechanism. One great difficulty will probably