REFORM
IN
ORGAN BUILDING

BY

THOMAS CASSON

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THOMAS CASSON, ESQ.

I am particularly glad to bring my ideas before your Guild because it is not one primarily concerned in the building or playing of organs. The question of reform in the organ is not primarily one for the organ-builder, and is only secondarily for the organ-player. First and foremost it is for the "all round" musician. This idea is very clearly recognised, so far as the playing is concerned, by that useful body the College of Organists, whose aim is far higher than that of turning out organists and organists only, viz., to paraphrase a well-known saying—to make the organist a better musician, the musician a better organist. In this endeavour the College must have the sympathy of us all. I have endeavoured to emphasise this point also in the terms of the dedication to Mr. Best of my first work.

It is then primarily in your quality as a Guild of Musicians that I invite your attention to the following remarks: premising that I do not wish to lay down the law except so far as it has been done by recognised authorities, and that I shall be glad at the close of the lecture to answer any intelligent criticism or to give any explanatians that may be demanded.

The modern English organ-builder looks complacently upon his typical instrument, and it is difficult to persuade him that it is very imperfect. I will, however, quote two eminent authorities whose consensus is most significant, viz., Mr. W. T. Best and Mr. E. H. Turpin—significant because it is well known that on several points the great Liverpool organist does not hold the same opinions as the accomplished musician whom we all regard as the personification of the College of Organists. What says Mr. Best?

"*September*, 1884.

"My Dear Sir,—Accept my best thanks for your book and kind letter. My experience leads me to value your immense improvements..... If I had your patent applied to —— organ, you may guess how much I should appreciate it. A year or two ago I gave a recital at the ..... and there found an ingenious (?) arrangement; the whole pedal organ was thrown out at the same time as the Full Great Organ; but if you wanted a soft pedal organ immediately, your hand must make the necessary alteration in the pedal organ. The great drawback to any improvements in organs has been the unwillingness of builders to listen to any suggestions, or to move out of their groove. . . . . Personally, I thank you with all my heart, and beg to assure you that it shall not be my fault if your improvements are not more widely known and more generally adopted. Believe me, faithfully yours, J. Stimpson.—Thos. Casson, Esq."

Without going further, I think that I have quoted authorities sufficient to start with the following axioms:

1. That the modern English organ is unsatisfactory as a whole.
2. That its basses are especially so.
3. That it is difficult to stir up organ-builders to the appreciation of progressive or thoroughgoing ideas.

The last axiom laid down with full knowledge and appreciation of various beautiful *details* of construction for which we have to thank modern builders.

I propose to contrast the English and German instruments of two hundred years ago, to examine their respective advantages and defects as bearing upon broad principles, to trace briefly the evolution of the present form of English organ, and to show that by falling back upon a combination of sound English and German principles we may obtain more satisfactory instruments. It is by this means only, and not by commencing with the adoption of details, however ingenious, of piecemeal and makeshift character, that progress is to be made and efficiency and comfort are to be secured.

It is here that the College of Organists made in their celebrated conference their great mistake. I think that you will agree with me that a great conference should again be held by them, at which important principles, almost entirely neglected by the builders, should be laid down. That this was not done is not only regrettable in itself, but has given rise to a report that the College "feared the wrath of the builders" forsooth, if they should venture to treat of anything but the

"outer timbers" of the organ! The absurdity of the report is obvious to anyone who knows the College; but not too absurd for adoption by some builders, who complacently regard it as evidence of their superior wisdom. That is as if the soldier, musician, or workman were to be dictated to by the maker of the weapon, instrument, or tool!

I speak of the builders generally; but I am bound to admit that in the case of a few I have found some symptoms of "divine discontent." It is of such men and such only that there is hope. The artist who is content is ever on the down grade.

The case then that I would present to you is that by falling back on broad principles, we may blend the organ into one homogenous, sympathetic, controllable entity, and entirely get rid of the present objectionable features and defects. That is my case, but I propose to show not only this but that by adopting this course we may secure greater economy in money and room, and gain enormously in simplicity of build and manipulation. It will be for you to decide whether or not I shall have proved this also.

It may appear to be like "flogging a dead horse" to discuss the G organ, but it is necessary in investigating these principles.

We must remember that our great-grandfathers were satisfied with a thin harmony which, to our ears, is ludicrous; consequently the desertion of the middle of the clavier to enable the deep basses to be touched by hand was scarcely noticed. The great English principle was adapted to the end in view and was reasonably carried out. If a change had to be made from "full" to "verse," the hands were transferred to the clavier of an organ having bass and treble instantly ready, appropriate, sympathetic, musical. In spite, therefore, of the irreconciliability of the details of this class of instrument with modern requirements, I draw your particular attention to the underlying principle, great and important. *Each division of the organ was complete as a musical entity.* We will presently consider whether this noble principle is irreconcilable with the CC compass. The G organ, characteristic of two hundred years ago, retained its general features until some fifty years since, when not only had the partial introduction of the pedal led to appreciation of a fuller harmony, but the music of Bach began to attract attention. This led to the battle between the "G men" and the "C men," a contest of the bitterness of which few of the present generation have any idea.

In Germany the pedal organ had long been known and esteemed. The organ was always regarded as of 16 ft. compass, but the relegation of the deeper notes to the pedal was found to be the most convenient method of playing them. Thus we find that the pedal organ was the place for the basses of the chief manual stops, which in England would have been cut short at GG and left on the manual. The German organ was therefore also a complete musical entity, theoretically more complete than the English. No adequate mechanical appliances existed, however, for shifting the pedal basses with appropriateness and speed sufficient to sympathise and synchronise with the manual changes. The stops could be only "set" beforehand, and as the pedal bass could be dispensed with more readily in the soft than the loud passages, the pedal organ became in the main (as may be seen in the music of Rinck and even more recent writers) a bass for the great organ only. It is obvious that for instantaneous provision of appropriate basses the English *principle* was far better. The absence of pedals made the harmony thin, the pedal *obbligato* was of course unappreciated; but the pure, deep, sympathetic basses of old English organs—so ruthlessly destroyed by modern builders—are still remembered with regret when contrasted with what Mr. A. J. Hipkins truly calls our "senseless pedal basses."

I trust that I have now made clear the two great principles of the English and German methods respectively. The English, that each department of the organ must be complete; the German, that the pedal organ must contain representative basses for the chief manual stops.

It will have been perceived that these two principles are alike excellent in theory and defective in practice. Leaving the Germans to amend their own defects, as they have recently done to a great extent, we will for a moment glance at the development of the pedal in England to see how both principles were deserted in its case. The first pedals introduced merely dragged down the lower notes of the great organ, but were afterwards reinforced by a few "pedal pipes" in unison or "repetition." Increasing appreciation of the pedal *obbligato* enforced a demand for 16 ft. compass, and after a few grand efforts to maintain the English principle in connection with it, the manual compass was shortened to the C of 8 ft.

Here occurred a most serious error. The English builder, ignorant of the theory of the pedal bass and unaccustomed to regard the pedal stop as anything beyond a mere reinforce-

ment, looked upon the alteration as a shortening of the manual compass and not, as he should have done, as a lengthening of the compass of the organ. This error, involving the denial of the pedal bass theory, continues to this day with the most disastrous results to English art. The apparent saving of cost was, and still is, applied to the multiplication of manual stops, the pedal having generally only one or two stops and they of large scale and loud intonation. Even, as Mr. Best says, when a reasonable number of stops is found, they seldom provide a bass for anything more than the great organ.

Here let me quote from a writer who, by profound study and eclectic spirit, is thoroughly competent to express his opinion in this matter, viz., Mr. Audsley, F.R.I.B.A., of Chiswick.* He says: "It is quite safe to say that of all departments of the church organ, as commonly constructed in this country, the pedal is the most deficient and radically imperfect. These lamentable shortcomings are attributable to several causes, viz., shortness of funds, deficiency of space, want of proper conception of the true office of the pedal department, etc. Now it is not too much to say, that without an adequate pedal organ, it is hopeless to construct a well-balanced and satisfactory instrument. Judging by the generality of church organs constructed in England, it is obvious that the true office of the pedal department is altogether misunderstood or ignored, and that it is sacrificed or denuded of its true glory for the sake of the manual departments. Nothing could be more short-sighted than such a method of procedure. It must be recognised, once for all, that the true office of the pedal stops is to carry down and to furnish correct basses for the foundation and other important stops in the manual organs, and unless they do so the pedal organ is a fraud. In addition to this, it must within itself have a true harmonic structure, and certain of its stops should be made *expressive* by being enclosed in one or other of the swell boxes."

Here, then, is a clear statement of the theory ad requirements of the pedal basses. WE MUST HAVE MORE OF THEM. In order, however, to avoid the German defect by which we arrive at the same pitiful conclusion, a bass for the great organ only, we must devise a system of control.

For this purpose the resolutions of the College of Organists will not serve. It is useless from an artistic point of view to adopt such conclusions as those in resolutions four and six. To make the pedal basses move in sympathy with

* This is all to the same effect as my "Modern Organ," 1883 (Reeves), but I prefer quoting others.

the great organ only is to accentuate and perpetuate the lamentable error already condemned. You have seen what Mr. Stimpson thought of this contrivance. To have an appliance to shut off the pedal organ to "a soft 16 ft. tone," without reference to the quality of that tone, is absurd. The pedal couplers too are of equal musical importance, so it is unreasonable to provide elaborate arrangements to bring on and off the great pedal coupler while making no similar provision for the others.

Pray do not think that I in the least blame the College of Organists for these resolutions; they are as good and sensible as anything that can be devised with the present style of instrument. To obtain ready control we must revert to the old English principle, viz., *every department of the organ must be absolutely complete.* Adding to this the principle of the pedal organ, *the pedal stops must provide the basses of as many as possible of the chief manual stops*, we are driven irresistibly to the conclusion that to combine the advantages of German completeness and English control, *every manual organ must have its own appropriate pedal organ.* This is the central feature of my system, and I must beg for your careful consideration of it.

To complete this amalgamation of the English and German principles, two important matters require consideration, viz., the couplers and combination movements. These are contrivances that hitherto have been applied in a haphazard and unsystematic manner.

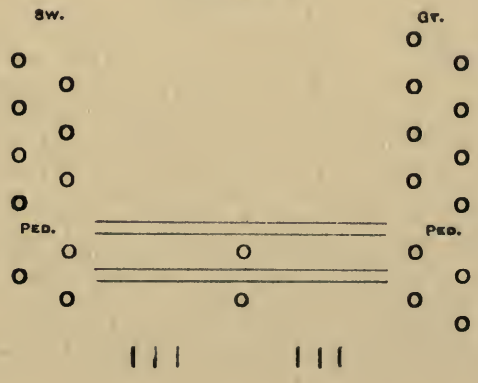
Now what is a coupler? It is simply *a mechanical stop*, adding the resources of one department to those of another; or its action may be regarded as analogous to that of a ventil, attaching to the augmented department a given combination already made up. Whether regarded as a stop or ventil, however, no one would think of dissociating it from the department which it augments, whereas all that has been done with couplers is to accumulate them at the performer's left hand, under the moribund idea that the left hand is of little importance as compared with the right, or else they are relegated to hitching pedals in an equally unsystematic and even more confusing manner. It is in either case impossible to remember them in an organ to which we are unaccustomed. Apply to this difficulty the English principle, and it at once disappears. Let the couplers be grouped with the division which they augment, and their place and office are at once found and remembered. In this way the "swell to great" coupler ranks as a stop of the great manual organ, "swell to

pedal" becomes a stop of the pedal swell organ. Both couplers will be grouped with the stops of the division which they augment.

Of combination actions I do not propose to treat at length to-night; much may be done in the way of improving composition pedals and pistons so that they shall be adjustable at the will of the organist, as is done by Rossevelt, of New York. At the same time it must be remembered that the performer's memory and presence of mind have a limit; still if (as is probable) he in a large measure stereotypes his pet combinations, he will have at least his own stereotype instead of that of the builder, a vast improvement. This, however, by the way. What I want to impress upon you is the application of the English principle to these accessories. To carry it out, the combination actions must control all the stops of a given organ, i.e., the manual stops, the couplers which augment the manual, the corresponding pedal organ and the pedal coupler. By this means everything will be simultaneously prepared for action.

Let me now draw your attention to diagram No. 1, showing the exterior arrangements of a two-manual organ. At the right we have the great organ group, consisting of great manual organ with augmentative manual coupler at the top, viz., swell to great; immediately below are the pedal stops, viz., three sounding and the coupler great to pedal. This group of pedal stops and coupler I term a *pedalier*. Below, at the right side, are three composition pedals. These act upon the entire group of the great organ, setting an appropriate bass and controlling the couplers. At the left side are the swell manual stops, the swell pedalier (all the stops of which must

DIAGRAM I.



be in the box) and the swell composition pedals. You will see that we have in every respect two absolutely complete organs.

Here we are confronted with a difficulty. We have only one pedal clavier, and it is impossible conveniently to have more. In order to get over this, I introduce for each organ an appliance called a "help." This may be a pedal, but is most conveniently a pneumatic stud placed immediately under each manual. The office of the "help" is to attach to the pedal board all the pedal stops (including the coupler) then drawn in the pedalier, simultaneously cancelling (without moving them) the stops of the other pedalier. There is a special arrangement by which, when the swell is coupled to the great, the great help brings on the pedaliers of both, though the swell help will continue to detach the great pedalier.

To resume our subjects, we will go first into the matter of cost. Let me again quote Mr. Audsley, who, after giving examples, says: "I am perfectly aware that the large-sized pipes necessary for the pedal organ are both costly and cumbersome affairs, and that the deficiency in funds and the blunders of architects generally militate against the more liberal introduction of them. But, in the name of art and common sense, it is surely more advisable to scheme an organ with all its departments properly balanced and fitted to each other, however circumscribed they may be, than to have the manual departments enlarged at the expense, if not to the total ruin, of the pedal organ. Where is there an English church organ schemed on such lines as those followed in the appointment of the moderate-sized instruments in the Lutheran churches of Warsaw and Vienna? The former organ has eighteen manual stops and nine pedal stops, while the latter has fifteen manual stops and eight pedal stops. Eight or nine pedal stops are considered by English builders to be ample for an instrument of four manuals and forty-five or fifty manual stops. By far the greater number of organs in this country have only one, two, or three pedal stops. I have commented upon the absurdity of depending upon our master-of-all-work deep booming 16 ft. 'open diapason,' or still worse, a 'tubby' bourdon, to supply an appropriate bass for fifteen or twenty manual stops. It is truly melancholy to note the shifts organists are put to in performing on instruments with totally inadequate pedal organs."

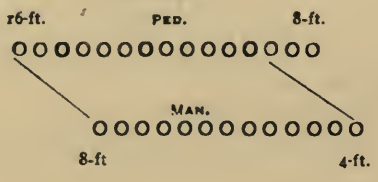
I do not advocate so large a proportion of pedal stops as is here given; but this is sufficient to show that even if you

do not approve of the contrivances that I am about to describe, you are not thereby excused from providing a sufficient number of pedal stops—say twenty per cent of the whole, exclusive of couplers and solo stops. Adequate pedal organs must be provided in any case and at any cost.

If, therefore, you like my principles but do not like the following contrivances, you can have entirely distinct pedal stops. An organ of the sort will cost no more by adopting the principles than an ordinary organ adequately provided with pedal stops. I wish to point out, however, that we may save enormously in room and cost by two important details or appliances, viz., borrowing and duplication. Borrowing is an old and well-known contrivance by which a stop is made to speak, pipe by pipe, upon two claviers, an example being the solo organ in the Birmingham Town Hall. It is a contrivance in some disrepute, being generally defective in construction and frequently applied in a way that should be described rather as thieving than borrowing. But abuse is no argument against use. The mechanical difficulty need not exist in these days, and all that we have to see is that the borrowing is legitimate. To do this only one law is necessary, viz., *the borrowed sound must not be lacking in the original stop when both stops are used together.* In this law, as in others, we may apply the saying, *de minimis non curat lex*, as may be seen.

Let me again direct your attention to figure I. We will suppose that in the Great Manual stops we have a Bourdon of 16 ft. and an Open Diapason of 8 ft. In order to get a pedal Open Diapason of 16 ft. we require only twelve pipes; for the upper range may be borrowed from the lower range of the manual Open Diapason, say, eighteen pipes from 8 ft. upwards. To see if this clashes with the law, I refer you to diagram II. Here you will see the twelve pedal notes, and a representation of manual diapason notes from 8 ft. upwards. The action of the coupler is shown by the diagonal lines. The 8 ft. manual note speaks with the 16 ft. pedal note, the 4 ft. manual note with 8 ft. pedal note, and so on.

DIAGRAM II.



Now if you complete the pedal range and strike the 8 ft. pedal and 4 ft. manual note, you will perceive that you have an 8 ft. manual pipe standing idle, which might just as well be borrowed for the 8 ft. pedal note. This form of borrowing, therefore, does not break the law. Similarly the manual Bourdon may be borrowed in 32 ft. pitch in its upper range, and be pieced out with twelve notes of Quint of $10\frac{2}{3}$ ft., a stop which, in this octave, and in this octave only, may be made to give satisfactory 32 ft. notes. In case of extreme necessity, even the Quint may be borrowed; but the borrowed notes would be tempered, and therefore not quite perfect—still, as I know by experiment, even this is not bad. Lastly, we may borrow the manual Bourdon for the pedal in 16 ft. pitch. Practically the manual Bourdon is never used without the 16 ft. Open Pedal stop, and as it is intended to be soft in tone, it comes under the excepted trifles of the Latin adage.

Passing over to the swell side, we may consider that the swell contains a Bourdon of 16 ft. and also a Trumpet of 8 ft. This Bourdon we can borrow satisfactorily for the Pedal in 16 ft. The Trumpet can be borrowed from 8 ft. upwards for a 16 ft. Trombone, being completed by twelve notes of pipes, mitred, in the swell box. Of the extraordinary grand effects of a Pedal reed thus treated, though only in conjunction with a small swell organ, there is an illustration at St. Mary's, Denbigh, which Mr. Heywood and some other gentlemen, present to-night, I trust, have heard.

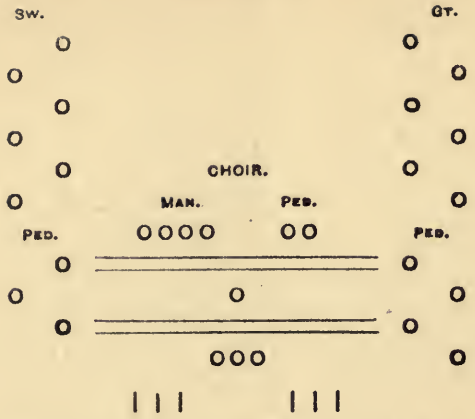
I wish to draw attention to the value of this method of borrowing in the case of long-manual organs, say, the GG, FFF, or CCC, which it is desired to reconstruct to CC manual compass. You know the usual process; the lower notes of the diapasons, often the most superb work of the most superb workers, are discarded and sent literally "to pot." Take the work, for instance, of such masters as Green. Where can we find one of his organs preserving its old musical characteristics, if once the builder has been entrusted with it? The swell will be taken down to CC, as Green, no doubt, would have done, but the *organ* will have had its basses lopped off to fit the compass, and a few noisy pipes, that would have sent Green mad, are put to match his deep, sweet tones. It is of no use crying over spilt milk, but I could inveigh for an hour against this brutal treatment of work into which good men put their very soul—this smug philistinism which demands the denunciations of some musical Ruskin. We may with care make this work speak in its proper registers. If we cut off the manual of a GG organ at CC, we shall be pro-

vided with basses for all the chief stops of the great and choir down to GG, needing only seven pipes for each pedal stop. In the case of a very large organ, we may add a "Great Bass," and we *must* provide basses in the Swell box; but we can with efficiency, economy and reverence, retain all good old work.

This method of borrowing can be extended; but you will see that we want thirty-six pedal pipes only, or, at a pinch, only twenty-four, to give us five effective and useful pedal stops. So much for borrowing, now for duplication. So far as I am aware, this is my own idea. Borrowing is the use of a stop, pipe by pipe, on two *different* claviers. Duplication is the use of a stop or coupler, *en bloc*, or two or more divisions of the *same* clavier, in such a manner that it has a separate drawstop and separate working for both. I have shown how two or more separate pedal organs with their augmentative couplers can be attached alternatively to one pedal clavier; I now proceed to show how two or more *manual* organs with *their* augmentative couplers, may be attached to our *manual* clavier.

Let me draw your attention to diagram No. III. This represents, as before, a two-manual organ, and under the centre of the manuals are the pedal helps. The novel portion is the choir organ, attachable, alternatively, to the lower manual by two manual helps, which appear on either side of the pedal help of the lower manual. These, by means of ventils or by my peculiar arrangement of valve chests, shut off and bring on the great and choir; that is, if you touch the right hand one the lower manual becomes the great, on touching the left hand one it becomes the choir, in each case bringing on the stops which have been drawn in their respective division. There is one coupling action for the upper manual to the lower; but in the great organ group there is a stop, "swell to great," which has the power of bringing this on. In the choir there is a similar stop acting on the same coupler and labelled "swell to choir," neither of these two coupling stops will act, however, even if drawn, without the attachment of their division to the manual. Thus if we draw "swell to great" but not "swell to choir," then the coupler comes off automatically on changing from great to choir, and *on* again on changing from choir to great, though we do not touch a stop. This is duplication of a coupler. A similar duplication occurs in that which attaches the lower manual to the pedals. In the great pedalier there is "great to pedal," in the choir pedalier it is "choir to pedal," and it is dependent on the attachment of its pedalier in each case.

DIAGRAM III.



Again, the pedal bourdon of 16 ft. (which has not a single independent pipe) draws and works in the great and choir pedaliers, perfectly independently. Again, in the great organ stops there is a ventil which can attach the choir organ, though there is no similar valve to attach great to choir. We can thus couple choir to great, but not great to choir. Thus we have two pedal coupling actions and one manual coupling action, but our coupling stops are swell to great, great to pedal, choir to great, choir to pedal, swell to choir, swell to pedal. This explanation will show how by borrowing and duplication we gain in funds, simplification and room. Let me now show how we gain in musical resourcefulness. The arrangement shown will not do all that can be done by a three manual organ; for the great and choir cannot mutually accompany each other, but at a trifling addition to a two manual organ we get *most* of the practical advantages of three. We might have divided the upper manual say into swell and echo. There is but one pedal help to each manual; it brings on the pedalier of that manual whatever that manual may be at the time. Let us now study the working of this. Throw out the full great and full swell by composition pedals, and in the choir and its pedalier respectively draw the dulciana of 8 ft. and bourdon of 16 ft. without any couplers. Touch the great manual help and the lower pedalier help and you have full organ with all couplers and proper pedal basses. Now, while playing on the lower manual touch the choir help. Instantly, without moving another appliance of any kind, the lower manual becomes a dulciana only, with 16 ft. bourdon uncoupled. Touch the

great help and we have full organ again with all couplers and proper basses passed to the swell, and touch its pedal help and we have full swell with its proper basses and pedal coupler, pass to great and touch the bottom pedal help and we have full organ again. We will now glance at our ordinary feature of English organs not found in this. I allude to the large scale open wood pipe of 16 ft., commonly but wrongly called open diapason. Its origin is to be found in the "pedal pipes" of sixty years ago, but it has its equivalent in the "major bass" of the German organ. The difference is this, however, that whereas it is one of the first pedal unisons in England, it is not introduced into German organs except in such as have about sixteen stops on the pedal. I am far from denying the value of this stop. Cautiously used, and only so, it is capable of magnificent effects, closely allied to those of the tuned drum in the orchestra. That being the effect it is clear that it should be held in reserve, but what is the common practice? Simply to give the organist no choice between this great "booming" stop or a forced and "tubby" bourdon. Out of these materials the organist has to furnish basses for soft or loud, diapason, flute or reed, expressive or inexpressive treble. His position is much the same as that of an orchestral writer who should be restricted to bassoons and kettle-drums for bass, and it is small wonder under such circumstances we come from church with a headache.

The first requirement of the pedal is a true bass, but the "great bass" even of the largest scale may be introduced in large instruments as the timpani of the organ orchestra. This, then, is the treatment to be observed in relation to this stop.

A very important matter, but one which has as yet attracted no attention amongst organ builders, is the valuable, in fact the most valuable, of the suggestions of the College of Organists, viz., that "melodic" stops be provided for the pedals. An obvious objection is that if provided they cannot be got at while playing. Suppose for instance that we had a pedal clarinet of 4 ft. and bassoon of 8 ft. on the pedal clavier. We might desire to play with this combination the *canto fermo* of a Gregorian chant for one verse in the middle of a psalm, the pedal in the preceding and succeeding verses acting simply as bass. This with organs as now made cannot possibly be done. It is in fact obvious that just as a solo stop on the manual is of no use unless we have a separate manual in which to prepare and play it, together with other manuals to accompany it, so solo pedal stops are of no value unless we can have them similarly prepared and accompanied. This difficulty is at

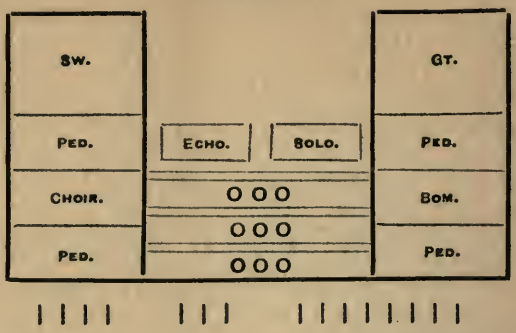
once surmounted by the English principle. The *pedal organs must be complete* even to the providing of solo stops. In this way we can pass from one pedal organ to another, and take up pedal solos in the middle of the most elaborate music. We cannot transfer our feet from one pedal clavier to another, but we *can* transfer that clavier from one pedal organ to another. You will thus see that whether we require instantly a true and accurate bass to any manual combination, or whether we require instantly the roll of the drum or a pedal passage of solo or *obbligato* character, at variance with any of the manual combinations, the separate pedal organs or pedaliers are indispensable. The method opens up a vista of new and beautiful effects as yet unknown, and I can conceive of no other way in which they are obtainable. It will be for our organist friends to say whether they approve of these effects, and if they do, to press for such organ building arrangements as will make them practicable.

I will now direct your attention to the practical application of all the foregoing principles in the rebuild now progressing for the organ at St. Paul's, Balsall Heath. The first instalment of that work is the allotment of the present six pedal stops by duplication so as to form with their couplers three complete organs, viz., great, swell and choir. There will be eight compositions to set the great organ with pedalier and couplers, four for the swell, and three for the choir.

As a sort of castle in the air, however, Mr. Heywood and I have designed the arrangement shown in diagram IV, of which you have the complete specification before you. I refer you first to the diagram. You will see that at the right hand we have the great organ all complete and the bombarde or loud solo organ. Above the keys are the stops of two complete organs, the solo (wood-wind) and echo organs, attachable to the choir and swell claviers respectively. You will see that the manual solo organ can by the pedal coupler be made to afford a ready solo for the pedal, e.g., clarinet and violoncello of 8 ft., which may be instantaneously taken up and relinquished. The pedal helps are in all cases in the centre of their clavier; the manual helps at either side of them. It is a necessity of the system that the coupler swell to great unison and swell to great octaves be with the great organ stops; but as that may be deemed awkward (in spite of their being controlled by the combination action) two pneumatic pistons will be provided for their further control. Any two pedaliers can be coupled by simultaneously pressing their helps; but in a two-manual organ, if this power be desired—a third help must

be provided at the cost of a shilling or two, the office of which is to release the pedaliers.

DIAGRAM IV.



I hope, Mr. Chairman, that you will not take your cue from "Punch" of this week and sarcastically compliment me upon the patience of my audience.

PRINCIPLES.

It is necessary that each division of the organ (great, swell, etc.) *be absolutely complete.* To this end:

1. Each division must have its special pedal division, called a *pedalier.*

2. *All couplers are stops* of the division which they augment, e.g., swell to great, a stop of the great organ, choir to pedal, a stop of the choir pedalier.

3. Combination actions must govern a complete division, i.e., all the couplers and other manual and pedal stops.

4. The pipes of the swell pedalier must be in the swell box.

5. The *stops* of each division must form one group.

PRACTICE.

More than one pedal clavier is impracticable; any pedalier must therefore be attachable to it (to the simultaneous exclusion of others) by a stud called a "pedal help."

When two manual divisions are coupled, the pedal help of the augmented division must attach the pedaliers of both.

If a pedal stop be suitable for more than one division it must draw and work separately for each.

Any pedalier may contain special melodic stops.

Two or more manual divisions (called in this case sub-divisions) may be attachable to one manual clavier by manual helps. In this case the couplers must be allotted separately to each sub-division, and each sub-division is subject to all the above principles.

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NOTE.

Since delivering the Lecture, the Scheme on page 20 has been criticised as not possessing the Solo or Orchestral Clavier. Apart from the fact that not more than three claviers can be conveniently placed to lie under the hands, the idea of a fourth was discarded for the following weighty reason.

The essence of orchestral effect lies in the *contrast* of tone-families one with the other, the very effect to which the solitary orchestral clavier cannot attain. To "lump" the orchestral stops on one clavier is as absurd as the "lumped," and therefore unmanageable, "pedal organ." This scheme provides three orchestral claviers, all lying under the hands, all provided with coupling actions and with suitable and instantly available pedal basses, but does not interfere with the ordinary broad *Organ* effects of Great, Swell and Choir. The superiority of this arrangement is manifest, while the simplification of mechanism and manipulation is enormous.