

for Mr. Stansbury

THE ORGAN
IN
GROTON SCHOOL,
GROTON, MASS.,
U.S.A.



The Organ at Groton School, Groton, Mass.

(Photograph by Wm. King Covell)

The Organ at Groton School, Groton, Massachusetts, U.S.A.

By WM. KING COVELL

THE organ recently completed in the chapel of Groton School is the latest and in some respects the finest of the instruments built by Mr. G. Donald Harrison since he came to America. It illustrates also certain tendencies in contemporary American organ building which are of more than local importance, and for that reason the instrument is deserving of a somewhat extended description.

Mr. Harrison has worked in three distinct styles¹ since he became connected with the Æolian-Skinner Co. There is a logical sequence or development, for the later phases are based upon and presuppose the earlier. At first, he built in the Willis III. manner, with which he had been familiar at home. A few years later, he modified that somewhat to accommodate it to American preferences and prejudices in part, and also to make it less definitely English in its European outlook. Recently he has evolved a third style, which is more retrospective. The Groton organ illustrates this most recent phase.

In general, this new style differs from those which preceded it in that it is founded upon a more thorough study of the work of organ builders of the past combined with a critical survey of contemporary practices. It is now generally admitted that the best work of the old builders had certain elements of tonal distinction and musical usefulness which have recently largely disappeared from the organ. It is also recognised that modern organ building has produced certain classes of tone that are far from satisfactory. That fact seemed to imply that a new study of the entire subject must be made, in order to retain what is good in modern practice while avoiding that which is undesirable, and at the same time to bring back what was good in ancient practice while avoiding its technical shortcomings.

There seem to be possible three attitudes towards the past. One of these is indifference. It is characteristic of most builders, probably because

¹ The study of these styles is most interesting. They are personal to Mr. Harrison, for they would not have been possible without his technical knowledge and experience. Nevertheless, certain students of organ history and design have been influential in their development. Among these should be mentioned particularly Senator Emerson Richards, than whom no one in America has done more sound thinking in terms of the organ.

they are absorbed in their own tonal and mechanical problems, possibly because they wish to maintain a particular type of instrument which has become associated with their names. To them the past is at best of but negative significance. Another attitude is that of the copyist. This is the type of builder who, feeling, perhaps, the charm of what little unspoiled old work there is left, thinks he can get equivalent effects by reproducing as minutely as possible the pipes of the old builders. The difficulty with this approach is that it results in the transfer of details only; the more subtle characteristics, the product of which is sometimes spoken of as the builder's "style," are too elusive for reproduction, and hence the result is neither old nor new, neither the style of the original nor any recognisable contemporary style. A third attitude is that of the scholar. This is the attitude of discerning impartial study of the whole subject. It is the attitude neither of the antiquarian nor of the progressive. Furthermore, it involves the formulation of principles, derived from a study of particular aspects. These principles, if properly derived, embody the essence of the subject. Hence, they are a safe guide for one who wishes to understand it. As applied to organ building, this attitude enables one to regain what is valuable in ancient organs through the comprehension of the principles which underlie them, and by the intelligent application of these principles to contemporary conditions the builder can create something new and original, and yet retrospective at the same time. Such principles also are valuable in that they enable one to select what is good in contemporary work from the much that is indifferent or poor, for such principles are universally applicable. This third attitude towards the past is much the most intelligent. It is the basis of the third Harrison style.

The principal characteristics of this style are: the restoration of the flue chorus to a place of primary importance; the almost complete elimination of extension; the introduction of the positiv; and the general lowering of wind pressures.

The flue chorus is really the organ, strictly speaking. In former times that fact was tacitly recognised: now it is nearly forgotten. Other voices are present to lend colour to the ensemble or variety to the playing, through affording imitations of orchestral qualities and solo and accompanimental effects. But these functions are relatively secondary. What is of first importance is the flue chorus. Unless the chorus be complete and properly integrated, the organ cannot be an effective musical instrument. In Germany, this principle has always been recognised. In England, however, the development of reed voicing in the nineteenth century caused the flue chorus to be first overlooked and then neglected. Especially has this been true in England in recent years, where a type of reed has been developed that is too heavy and smooth to combine successfully with flue-work. Since these reeds were hailed as an "improvement," it was thought necessary to modify flue-work so as to make it accord with them. Consequently, unison diapasons have been increased in scale and in number, and upper work, especially mutations, much reduced in quantity and in power. The result is that the constituents of the flue chorus supply weight and

harshness to the ensemble, but the chorus as such no longer exists. The characteristics of the flue chorus of the old builders were clarity, or transparency, and brilliance: there was no inert weight and no harshness. If such a chorus is to be brought into the organ again, its underlying principles must be applied, and all tonal elements and preconceived ideas in conflict with it thrust aside. If, then, a light and bright, cohesive and well integrated chorus is to be obtained, heavy unison diapasons, string-toned upper work and opaque reeds must be eliminated. Such a chorus demands, of course, not only the deletion of such opposing factors, but a proper adjustment of all its own constituents. In this respect, also, the principles derived from the best work of the past indicate the proper procedure. In terms of most contemporary work, unisons must be reduced in scale and in number, and upper work, doubles, and separate mutations much increased. More subtle factors—such as mouth widths and heights, frequency and depth of nicking, materials from which the pipes are made, provisions for tuning, and wind pressures—must be studied, for they all contribute to the final effect. A chorus built as indicated has a musical character much superior to that of the typical modern organ. It satisfies the two demands upon the organ in the church—the support of choral and congregational singing, and the rendering of organ music—much more completely than does the type of ensemble which consists of heavy metal flute-diapasons, sharp and discordant mixture ranks and broad but tight chorus reeds.

The elimination of extension is almost as important a factor in the development of the new style as the restoration of the flue chorus. Extension has been discredited among the better American builders for some years, and in the manual divisions it seldom is used. In the pedal it still appears, but to a less extent. At least two builders have come out avowedly in favour of the straight pedal, and have introduced it so far as possible in their recent instruments. In the organ under consideration, only one of the pedal ranks is extended and but two manual doubles are borrowed. One ventures to predict that the day is not so very remote when the completely straight organ, with no extension or borrowing whatsoever, will be re-established in America.

The positive organ is the logical result of the more careful study of earlier work. Individually it contributes a number of delicate and beautiful tone colours to the instrument, and thus makes possible a more flexible registration; but as a whole its contribution is more important, for it forms an ensemble that is buoyant and clear to a degree and, although bright, very mild and reticent. It is influenced by old German work, but, not being a literal copy, it has its own character, and is perfectly in accord with the style of the entire instrument.

The reduction in wind pressure was a pre-requisite to the attainment of the qualities of tone desired. At one time it was supposed impossible, on the ground that modern action work had been developed in terms of high pressure and was dependent upon it for prompt attack and release. A slight modification in the mechanism of the pitman chest proved sufficient to make it function perfectly on $1\frac{1}{2}$ in. pressure, however. Hence there was

no obstacle to the employment of as low pressures as seemed desirable. The principal tonal advantages ensuing are the elimination of windy basses and shrill trebles, and the improvement in the speech of small scaled voices of soft intonation such as dulcianas and stopped flutes. The diapason work on the whole, moreover, speaks more directly and naturally, and the cohesion is perfect. Even stops such as orchestral strings and solo reeds, which were supposed to benefit from high pressure, have been voiced successfully on moderate pressures. There seems no need to return to the high pressures generally used in the past, with their resulting unsatisfactory tonal effects and wasteful demands for power in the blowing.

Although often the specification is placed at the end of an article, it will be given here so that it may precede the discussion of individual stops.

PEDAL ORGAN			GREAT ORGAN			SWELL ORGAN		
Contre basse ...	...	...32	Principal ...	...	...16	Flûte conique ...	...	...16
Principal ...	...	...16	Principal ...	...	... 8	Geigen ...	...	... 8
Contre basse ...	...	...16	Diapason ...	...	... 8	Viole de gambe ...	...	... 8
Bourdon ...	...	...16	Gemshorn ...	...	... 8	Viole céleste ...	...	... 8
Flûte conique (swell) ...	...	...16	Flûte harmonique ...	...	... 8	Echo viole ...	...	... 8
Grosse quinte ...	...	10 $\frac{2}{3}$	Grosse quinte ...	...	5 $\frac{1}{3}$	Gedeckt ...	...	... 8
Octave ...	...	... 8	Principal ...	...	... 4	Geigen ...	...	... 4
Contre basse ...	...	... 8	Octave ...	...	... 4	Fugara ...	...	... 4
Flûte ouverte ...	...	... 8	Grosse tierce ...	...	3 $\frac{1}{5}$	Flûte triangulaire ...	...	... 4
Gedeckt (swell) ...	...	... 8	Quinte ...	...	2 $\frac{2}{3}$	Nasard ...	...	2 $\frac{2}{3}$
Quinte ...	...	5 $\frac{1}{3}$	Super octave ...	...	... 2	Fifteenth ...	...	... 2
Super octave ...	...	... 4	Tierce ...	...	1 $\frac{3}{5}$	Tierce ...	...	1 $\frac{3}{5}$
Flûte harmonique ...	...	... 4	Full mixture ...	...	IV rks	Plein jeu ...	...	VI rks
Gedeckt (swell) ...	...	... 4	Fourniture ...	...	IV rks	Bombarde ...	...	...16
Mixture ...	...	III rks	Cymbel ...	...	III rks	Trompette I. ...	...	... 8
Fourniture ...	...	III rks				Trompette II. ...	...	... 8
Bombarde ...	...	...16				Vox humana ...	...	... 8
English horn (choir) ...	...	...16	POSITIVE ORGAN			Clairon ...	...	... 4
Trompette ...	...	... 8	Rohrflöte ...	...	... 8	PROCESSIONAL		
Clairon ...	...	... 4	Principal ...	...	... 4	Viole ...	...	... 8
			Koppelflöte ...	...	... 4	Gedeckt ...	...	... 8
COUPLERS			Nasard ...	...	2 $\frac{2}{3}$	COMBINATION PISTONS		
Swell to pedal			Blockflöte ...	...	... 2	Swell : 1, 2, 3, 4, 5, 6, 7, 8		
Great to pedal			Tierce ...	...	1 $\frac{3}{5}$	Great : 1, 2, 3, 4, 5, 6, 7, 8		
Choir to pedal			Sifflöte ...	...	... 1	Choir : 1, 2, 3, 4, 5, 6, 7, 8		
Positive to pedal			Scharff ...	...	IV rks	Pedal : 1, 2, 3, 4, 5, 6, 7, 8		
Swell to pedal 4						General : 1, 2, 3, 4, 5, 6, 7, 8		
Choir to pedal 4			CHOIR ORGAN			PEDAL PISTONS		
Swell to great			Quintaton ...	...	...16	Swell : 1, 3, 5		
Swell to choir			Dulciana ...	...	... 8	Great : 1, 3, 5		
Choir to great			Unda maris ...	...	... 8	Choir : 1, 3, 5		
Swell to great 16			Viola ...	...	... 8	Pedal : 1, 2, 3, 4, 5, 6, 7, 8		
Swell to great 4			Orchestral flute ...	...	... 8	General : 1, 2, 3, 4, 5, 6, 7, 8		
Swell to choir 16			Lieblichflöte ...	...	... 4			
Swell to choir 4			Zauberflöte ...	...	... 2			
Choir to great 16			English horn ...	...	...16			
Choir to great 4			Trompette ...	...	... 8			
Swell 16			Clarinet ...	...	... 8			
Swell 4								
Choir 16								
Choir 4								

Three balanced pedais: Swell, choir, crescendo

Nine reversible pistons (placed between manuals): Full organ; manual 16ft. stops off; swell to pedal; great to pedal; choir to pedal; positive to pedal; swell to great; choir to great

Four special pistons: Choir only (positive cut off); positive only (choir cut off); positive on great (choir cut off); general release (in two separate locations)

Wind pressures: Pedal 5in.; great 3in.; swell $3\frac{3}{4}$ in.; positive $2\frac{1}{2}$ in.; choir $3\frac{3}{4}$ in.

Pedal pistons, as shown, duplicate manual pistons. General pistons affect all stops and couplers. Choir pistons affect both choir *and* positive. Swell, great and choir pistons have double touch which, when operative, affects corresponding pedal pistons; this may be cancelled by cut-offs, available for each manual separately. All pistons are adjustable at console.

The organ occupies a chamber opening into the second bay from the east end on the north side of the chapel.² This chamber is about 25ft. high, but it is 24ft. deep and only 12ft. wide, so it is not at all well formed to accommodate an organ. The chapel itself, however, is favourable to sound,³ and to some extent compensates for the hampering effect of the chamber. The organ case, and the gallery attached to it, were part of the old organ,⁴ and have not been altered.

In the pedal, the flue chorus is, of course, the most important group. It is all in metal, except for the 32ft. This rank is formed of small scale open wood pipes, and is practically a violone as it is smaller in scale and of less power than the Willis contra bass which Mr. Harrison used some years ago. It is about equal in quality and power to the Schulze type violone, but is not similar to that stop in that it is deeper than it is wide, whereas the Schulze pipe is square. At 32ft. it forms the double for the chorus. Although crowded at the back of the deep chamber, it speaks distinctly to the bottom pipe. At 16ft. it is a normal wood organ tone string stop. The 8ft. register is of some value, but, of course, an independent 'cello would have been more useful.

The chorus proper is complete from unison (16ft.) through octave, twelfth and fifteenth to mixtures, with the quint in addition. The balance in voicing and scaling is excellent; the cohesion is perfect. There is no muddiness, nor are there any lacunæ in the middle as is often the case. From top to bottom the chorus is clear, and the balance all one could desire. The 16ft. is firm, but not overstrong; the 8ft. carries the chorus well; the 4ft. is bright and clear, but not self assertive; the mixtures add an excellent top to the whole without being prominent by themselves, and the quints tie together the entire chorus without causing any thickness. Previously this sort of thing could only be found in old German organs, but in this modern instrument the scaling and regulation have been so carefully carried out,

² The chapel was built about 1900. It was designed by Henry Vaughan, an English architect who came to America in the early 1890's, and built here several very creditable churches in the Gothic style.

³ The reverberation period is 5.85 seconds when the chapel is empty, 4.9 seconds when full. There is no appreciable echo to distort or confuse sound.

⁴ The old organ was built by George S. Hutchings of Boston, shortly after the chapel was built. It was a three manual instrument of thirty-three stops, voiced on 6in. to 9in. pressure. A few years ago an attempt was made to improve the tone by lowering the pressure, but the result was not satisfactory. The organ was loud and coarse in effect, due partly to unbalanced scaling, and to the general use of slotting. It was not considered worth re-building, and so was removed and broken up when the new organ was installed.

that the result is even better than in many old organs. The mixtures, incidentally, are constituted 17 19 22 and 22 26 29 in terms of 16ft. pitch. Being available separately, they are more useful than would be a single larger mixture.

There are three flute stops on the pedal, the bourdon being a good example of the rather full-toned kind, the 8ft. an open wald flöte with inverted lips and a mild clear tone useful both as a solo stop and in combination; and the 4ft., a metal harmonic register which combines well with the 8ft., and is also valuable alone in works such as certain Bach trio-sonatas and chorale-preludes. The last, in particular, demonstrates the advantage of an independent stop, individually scaled and voiced, over any sort of stop obtained by extension. The pedal reeds are of only moderate power, of open and bright tone, contributing to the flue chorus but not overpowering it. The bombarde is one in the French sense only; it is a pedal counterpart to the manual reeds, but not in any sense similar to the usual heavy smooth pedal reed bass. The 8ft. and 4ft. ranks are of similar quality and of slightly less power.

The chorus of the great is one of real distinction. So complete is it that reeds are dispensed with, being considered not only unnecessary but actually undesirable. It consists of two choruses, one within the other. The principals constitute the major chorus, the diapason, octave and superoctave the minor. There is actually little difference in power between the ranks, as the 8ft. principal is only moderately powerful, and the diapason 8ft. is only slightly softer. But the ranks are so treated that each has its own accent: hence the major chorus has an effect by itself separate from that of the minor chorus; and, what is more interesting and unusual, the minor chorus adds appreciably to the strength of the major. The two quints and two tierces,⁵ drawing separately, make many gradations of power and colour possible. The mixtures are planned thus: full mixture, 12 15 19 22; furniture, 15 19 22 26; cymbel, 29 33 36. These mixtures break back at different points, one from another, and together form a complex texture in which breaks are imperceptible. One or more fifteenth ranks in the mixtures are stressed because the independently drawing superoctave is made slightly light in order to permit it to combine in due proportion with the minor chorus.

The entire chorus, as indeed throughout the organ, reed as well as flue, is made of spotted metal from the 4ft. pipe to the top. In the positive, however, only the principal and scharff are in spotted metal; the other ranks are *tin*. The use of these fine materials is an important factor in the tonal results obtained.

The general effect of the great chorus is difficult to describe. In some ways it reminds one of Schulze at his best. It also has something of the open ringing tone of a good flue chorus by Lewis. It is not specifically German in suggestion. Indeed, what affinities it may have with other work

⁵ Except for one of the pedal mixtures, in which a tierce appears, all mixtures in this organ are quint mixtures only. This makes possible a straight quint ensemble which, for bright and transparent effect, is often desirable. When a "full" effect is wanted, the independently drawing tierces can be added.

are the result of its being founded upon the same principles rather than the duplication of any particular details. Although intelligently founded upon work of the past, it is actually an original creation.

There are two non-chorus unison ranks in the great, placed there for general convenience in registration. The gemshorn is a soft but interesting rank, useful for accompanying solo stops, or in combination with soft stops of other manuals. The harmonic flute is valuable either as an accompanimental or a solo stop. Both stops gain appreciably over their counterparts in earlier Harrison organs because of the low pressures. Unenclosure also is an important matter. Perhaps here it should be stressed that unenclosure is a not unimportant element in the expressiveness of the stops of this organ. The assumption that enclosure automatically renders stops expressive is unfounded, for enclosure provides dynamic control only. It is true, to some extent, that enclosed stops are "flexible," as Dr. Audsley said, but they are not necessarily, therefore, expressive. In the organ, expression, so far as it can be obtained, is the result of the speech of pipes, and the organist's use of them. Without proper intonation, set by the voicer, or discerning phrasing, on the part of the organist, organ pipes cannot be expressive. But the better the speech of the pipes, the more they lose when enclosed, for the subtle concomitants of tone are lost in a swell box, and hence enclosure interferes with expression instead of enhancing it. In this organ the most important stops are placed outside a swell box, and the resulting fine effect of the instrument is due to that fact in no small degree.

What stands for the choir in most organs is here divided into two divisions. One, the positive, is on low pressure and is unenclosed; the other, the choir proper, is on higher pressure and is placed in a swell box. Both are valuable and desirable. The positive is essentially an ensemble group, and hence relieves the choir of any necessity for providing an ensemble for use in conjunction with the other manuals. The positive is based on 4ft. pitch rather than 8ft., and in doing so it follows the German⁶ precedent. There is no lack of balance, however, such as one might assume from the specification. The chorus centres round the principal and scharff, but the other stops contribute substantially to the ensemble. The scharff is a repeating mixture, beginning 19 22 26 29. Like the principal, it is formed of full scale but gently winded diapason pipes: the result is a quiet but sparkling tone. Although speaking on low wind, the stop, and indeed the entire positive, can be heard distinctly through the great when coupled to that manual, although it is not in any way assertive. The flute work is, however, the distinctive part of the positive. It is generally of large scale,

⁶ Indeed it follows old English precedent also. From the Restoration down to the opening of the nineteenth century, most English choir (or "chaire") organs were based on 4ft. pitch. The typical specification was: stopped diapason 8ft., principal 4ft., flute 4ft., fifteenth 2ft. A glance through Leffler's specifications, c. 1800 (Pearce's *Notes on English Organs*), reveals the following instances (some with slight amplification, but based nevertheless on 4ft. pitch): Westminster Abbey, and the cathedrals of Bangor, Bristol, Canterbury, Carlisle, Chester, Chichester, Cork, Ely, Exeter, Gloucester, Lincoln, London (St. Paul's), and Norwich, as well as college chapels and parish churches in great numbers. It would seem that this practice of differentiating the choir from the great, in pitch as well as in volume, obtained until the nineteenth century, when "restoration" and "improvement" destroyed it, as they did so many other valuable and desirable things.

with wide low mouths, producing, on low pressure, soft and mild tone, albeit definite and clear. The combinations available are almost inexhaustible, for the nature of the mutations is such that more than the usual number of groupings is possible and effective. The 8ft. is a metal gedackt, with wide chimneys, and has that slight reedy flavour that makes a good rohr flöte such an interesting voice. The 4ft. koppelflöte has a quality all its own. It is made of pipes, half-cylindrical, half-conical, and the resulting tone is that of an open metal flute, with some suggestion of a gedackt in addition. This combination produces a quality difficult to describe, and never before present in an American organ. The upper work is individually very mild, but it combines so flexibly with the 8ft. and 4ft. stops that the resultant effects are much the most successful the writer has ever heard. One might suppose that because of the lack of enclosure the effectiveness of these synthetic voices would be limited. On the contrary, the free open position⁷ of the positive enables them to have a floating transparent quality which is delightful. The 1ft. stop is particularly skilfully voiced: it is very soft, as its high pitch demands, but it is positive in intonation, and so forms an excellent top to the group of mutations without making itself individually conspicuous.

The choir division consists of accompanimental fluework and solo reeds. The dulcianas are worthy of particular comment. They are larger in scale than usual, but as the mouths are narrow and the pipes lightly winded the tone is that of an echo diapason, without the suggestion of string tone. The viola is a normal organ string, not imitative, which suggests an old-fashioned gamba in that it has the full and rich quality of such a stop without its defects in speech. The quintatön has sufficient edge to be interesting, but the twelfth is not disproportionately strong. It combines well with other stops in the choir, with the mutations of the positive, and also with the minor chorus on the great, to which, when coupled, it forms an effective double. The flutes are bright and clear, with no suggestion of thickness. The 8ft. is of wood, with harmonic treble; its lips are cut high and are rounded. It is imitative to a moderate degree of the orchestral flute in the middle and treble octaves; in the tenor it suggests the orchestral horn. The 4ft. is stopped metal, and has a clear and singing tone. The 2ft. is similar except that the pipes are *harmonic* stopped,—triple length. It has a silvery smooth texture which is much superior to the quality of the usual piccolo. The English horn is inserted at 16ft. pitch so as to be useful in combination with other stops; it can of course be played an octave higher as a solo stop. The clarinet is somewhat thin in tone, but is an effective solo stop.⁸ The trompette is slightly smaller than the swell reeds, and is moderately imitative, but its principal function is to

⁷ The positive is placed in the small gallery below the organ case proper, in which the console of the old organ was located. The positive thus stands quite in the open, with nothing to restrict its tone.

⁸ A broader, more organ-toned clarinet can be obtained synthetically on the positive by combining the 8ft., 2 $\frac{3}{4}$ ft. and 1 $\frac{3}{4}$ ft. stops. This solo effect is very successful, and it is an interesting contrast to the reed. In the swell, the absence of an oboe can very well be compensated for by combining the vox humana (without tremulant), echo viole and nasard. Without the viole, and possibly with the tierce, another clarinet tone appears. These are a few samples of the many possibilities which are available through the mutations.

supply chorus reed tone to the positive and great divisions, which it does admirably and in due proportion.

The two stops of the processional organ come from the old organ. They are not distinguished tonally, but as their function is to give pitch to the choir their character is immaterial. They may be drawn on either swell or choir.

The swell, although well planned and voiced, is perhaps less effective than the other divisions of the organ. This is the result of its position,—far back in the deep and narrow chamber. Individually, the stops are excellent. The reed chorus is particularly satisfactory. The quality of these reeds, as also of the reeds of the pedal and of the choir trompette, is something intermediate between that of Cavaillé-Coll and Father Willis: it has the brilliant open tone of the French reeds, with a moderate amount of acidity but without harshness, coupled to the better balance between bass and treble and the somewhat firmer tone of the English master. These reeds are brilliant but transparent: they contribute to their own department and to the entire organ, but they do not predominate. They seem to possess the ideal characteristics, in both power and quality, for chorus reeds in association with a complete and dominant flue chorus. There are two trompettes, but they differ only slightly in power. The two together do not give too much unison reed tone; but, as one is sufficient, perhaps the space occupied by the other could better have been used for some different voice. The bombarde and clairon are similar to the unison reeds, except that the bass of the 16ft. is, perhaps, too close in tone to be a good match to the predominant quality: a little more flare would have been helpful. The vox humana, which can be drawn without its tremulant, is useful in conjunction with the fluework.

Aside from reeds, the swell possesses a complete flue chorus from double to mixture. The 16ft., which is practically a tapered diapason, is useful with the softer fluework apart from the chorus. With the 8ft. and 4ft. geigens and the plein jeu (12 15 19 22 26 29), the chorus can be used in conjunction with or in contrast to the great and positive. The swell strings are of the gamba variety, and are somewhat more orchestral than is the choir viola. The fugara is an octave string, comparable to the 4ft. viola which was used by Father Willis in some of his larger organs: it demonstrates again the advantage of an independent rank over an extension,—i.e., an octave coupler. The echo viole is a soft version of the gamba. The gedeckt is a wood stopped diapason, of large scale and low cut mouth: it acts as a "filler" in combination, and is also a particularly successful example of stopped flute tone. The 4ft. flute is similar to the stop introduced by the present Henry Willis. The 2ft. is part of the chorus, being too strong for use as a mutation. The nazard and tierce, on the other hand, are definitely flute-like, and comprise a second set of mutations (enclosed) in contrast to those of the positive. It is very helpful to be able to set up combinations on two or three manuals at once, each involving independent mutations, for such a disposition makes for flexible registration.

Finally, a word of thanks is due to Mr. Twining Lynes, organist and choirmaster, for making possible the examination and photographing.