

The compass of organ keyboards in the Southern Netherlands during the late 16th, 17th and early 18th centuries

The purpose of this article is to produce an inventory of documented compasses of organ keyboards in order to be able to describe their development in chronological order. Such a survey has the potential to be a useful source of information regarding the histories and origins of both instruments and compositions.

The information about keyboards and their compasses is based on descriptions found in historic documents and research on preserved organs or fragments of organs. I have used information pertaining to instruments built by organbuilders from the Southern Netherlands or built in this area by craftsmen from elsewhere. Although it is impossible to gather all the relevant sources in one article, I hope that this survey will be sufficient to give a good impression of the development in the Southern Netherlands from the late 16th until the early 18th century.

The different compasses have been divided into categories. Each category brings together examples of keyboards with the same number of keys. These examples are listed in chronological order. References to specific examples are described in the footnotes. In addition to the place (city and church), the organbuilder and the year of each instrument's completion, in some cases remarks concerning the compass have been added in an extra column.

Information regarding particular elements related to the compasses of keyboards, such as split keys, the 'short' or 'broken' octave and the compass and division of the pedalboard is detailed in the individual chapters below.

Please note that 'C/E' refers to the arrangement of the bass octave known as the 'short octave'.

The 16th century: Keyboards starting from F

F, G, A – g², a² (38 keys)

Trier, dom (plan)

Arent Lampeler van Mill (1584)¹

Rugwerk only

Hasselt, St. Quintinus

Nicolaas Niehoff (1593/1594)²

Lier, St. Gommarus

orgelbuilder unknown, before 1618³

In the late 16th century a compass of 38 keys (F, G, A – g², a²) was commonplace. During this era it was quite normal to find keyboards with different compasses within a single instrument⁴; in some cases, for example, the compass of the Manuaal (Great) was extended in the bass through the addition of a so-called 'contra-octave'. The contra-octave was useful for playing at different pitches (16' or 8') without the need to change registration. In general the pedalboard started at F and was coupled to the Manuaal one octave lower⁵. (NB: A comparable situation has recently been reconstructed in the Van Hagerbeer organ (1643) of the Pieterskerk in Leiden). Some examples of organs built in the Southern Netherlands, including organs built by the organbuilder Niehoff from 's Hertogenbosch, are listed below:

FF, GG, AA – g², a² (50 keys)

Lüneburg, Johannis	Hendrik Niehoff (1551) ⁶
Bergen op Zoom, St. Gertrudis	Hendrik Niehoff (1555) ⁷
Gouda, St. Jan	Hendrik Niehoff (1556-1559) ⁸
Keulen, Dom	Hendrik Niehoff (1560-1573) ⁹
Trier, dom (plan)	Arent Lampeler van Mill (1584) ¹⁰
's-Hertogenbosch, St. Jan	Florent II Hocquet (1618) ¹¹

Unfortunately, documentation regarding the original pitch and compass of a number of these instruments has not yet been discovered. In some instances an organ's original pitch can be traced by taking measurements of the organ case. An example is the organ in the church of St. Jacques in Liège, an instrument built in 1600. No documentation has been discovered which reveals either the identity of the original builder, nor his concept for the instrument. Thimus and Schumacher have concluded from their measurements of the cases that the largest façade pipe in the main case was 12' long, whilst that in the Positiv was 6' long. These pitches may indicate that the organ's keyboards began at F¹².

'Modern times': Keyboards starting from C

Nicolas Meeùs undertook research into the origins of the short octave¹³. He points out that the system was developed in the 16th century for stringed keyboard instruments and was introduced in organs only after 1600. Some seldom-used keys in the lowest octave (especially accidentals) of chromatic keyboards seem to have been retuned ('scordatura'). The system whereby the note C is played by the key E, D by F-sharp and E by G-sharp became the standard arrangement which was later used for organs as well.

In my opinion this hypothesis is convincing. Two further authors have published additional information on this theme:

Grant O'Brien is more specific about the historic development of the short octave in harpsichord construction: The normal 'C/E' short octave began to appear in the period around 1520. From the middle of that century onwards, it became almost universal both in Italy and north of the Alps. Probably as a result of its commonly being found in organs, the short octave became the standard arrangement for stringed keyboard instruments as well¹⁴.

Vente assumed Jean Crinon to have been the first organbuilder in the Netherlands to produce a keyboard starting on C with a short octave¹⁵ in the middle of the 16th century. The author refers to the stipulation of 42 keys in the contract for the organ at the church of St.Vaast in Arras to be built by Jean Barbaise and eventually finished by Pieter Isoree (1585-90)¹⁶. In the description it is mentioned that the concept of the new instrument was to be based on the Crinon organ in the Cathedral of Arras¹⁷. An additional element to support the hypothesis by Vente might be the pitch of the organ's stops (Leuven, St. Pieter: stops at 8', 4' and 16' pitch¹⁸). Crinon seems to have been one of the most 'modern' builders of his time, a hypothesis confirmed by the fact that he was invited to build the organs for the Spanish court before Brebos was eventually contracted¹⁹.

From the description '*...tot elcken claviere moeten zyn drye clavieren meer dan den ordinarys te wetene die octave van cfaut, dsolre ende eelami, ende also wordt die octave van cfaut op acht voeten gerekent...*' in the contract for the organ to be built by Gieles Breebosch for the church of 'O.L.Vrouw over de Dijle' in Mechelen²⁰ (but eventually installed in the Church of O.L.Vrouw in Antwerp) one can conclude that, in 1566, this enlargement of the keyboard was (still) a novelty in the Southern Netherlands.

As late as 1573/'74 built an organ with F compasses in the St. Andrieskerk in Antwerp; this is suggested, in any case, by the pitches referred to in the contract (6', 3', etc.) On the other hand, one should treat such indications carefully: the Anthoni organ in the Dominicanenkerk in Atrecht is documented as having had a compass beginning on C, while the pitches of stops are expressed as 6', 12' etc. It seems unlikely that the organ had a so-called G-tuning (in other words that the key C played the note G), but rather that the stops were simply named according to the tradition established by the use of F compasses.

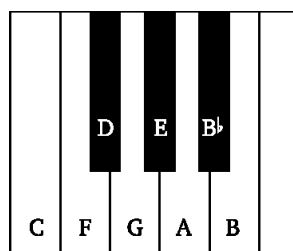


Diagram of a short octave

After the first quarter of the 17th century the compass of 41 keys became archaic and rare. A late example by P. de Lathour is the result of his re-using fragments of an older organ in a new instrument. The organ was examined by Gilles de St. Vitu (organist and precentor at Huy) and André Severin (*'m(aît)re faise(ur) d'orgues residen(t) en la ville de liege'*). They objected that: *'le clavis ne contient que quarante une touché ou lieu de quarante cinc, qu'il doit tot au moins contenir, selon que regulierement, les epinettes, clavis et orgues sont accoustumé d'avoir...'*²¹

Keyboards of 41 keys: C/E – g², a² (short octave)

Hazebroek, St. Eligius
Brugge, O.L.Vrouw

Louis van Halen & Pierre Yzore (1560)²²
Ysbrandt Claeszoon (ca. 1561)²³

'Het secreet te verlangen van vier toonen om dat het maer en is tot alamiere ende gebraght moet worden tot C sol faut...'
'...tot elcken claviere moeten zyn drye clavieren meer dan den ordinarys te wetene die octave van cfaut, dsolre ende eelami, ende also wordt die octave van cfaut op acht voeten gerekent...'
'...chascun clavier aront quaranteune esclefs embas cfaut...'

Antwerpen, O.L.Vrouw

Gillis, Brebos (1565)²⁴

Milaan, St^a. Maria
Escoriaal
Rouen, Cordeliers
Trier, dom
Bree, St. Michael

Gillis Brebos (1570/71)²⁵
Gillis Brebos (1577-1584)²⁶
Leonard van Cleven (1585)²⁷
Florent Hocquet sr. (1590-1594)²⁸
Nicolaas Niehoff (1593)²⁹

Gent, St. Michiel	Crespin Carlier (1596) ³⁰	In 1746 Pieter van Peteghem proposed adding 7 keys in order to make a compass of 48 keys. In the bass, the notes D-sharp, F-sharp and G-sharp were added, in the treble 4 notes: g-sharp, a-sharp and c. Van Peteghem forgot to mention the fourth key; doubtless this was b”.
Helmond, St. Lambertus 's Hertogenbosch, St. Jan Lier, St. Gommarus	Jacob Niehoff (1607) ³¹ Albert Kiespenning (1617) ³² Philips Snoeck (1618) ³³	<i>‘...clavieren, beginnende onder met csolfaut, ende boven endende met alamire’</i> <i>‘...nieuw clavier beneden csolfaut tot boven in alamire gelyc ende inder manieren dat het oude nu jegenwoordich is....’</i>
Atrecht, Dominicanen	Julles Anthoni (1621) ³⁴	<i>‘le clavier desquelles orgues commenant par bas en C sol fa ut finira par hault en A la mi re’</i>
Lebbeke, O.L.Vrouw Nijvel, St. Gertrudisabdij	Jan van Weert (1626) ³⁵ Nicolas le Royer (1640) ³⁶	<i>‘...met twee clauwieren van eeneviertigh toutsen...’</i> <i>‘...premier au ton naturel sonnant la devanture quatre piedz C.fa ut, le clavier contenant quarante une touche....’</i>
Lede, St. Martinus Huy, St. Victor	Nicolas II le Royer (1642/43) ³⁷ P. de Lathour (1640/’43) ³⁸	<i>‘... synde elken Register nu maer van 41 thoonen ofte clauwieren....’</i> <i>‘... le clavis ne contient que quarante une touche...’</i>

Keyboards of 41 keys? (hypothetical)

In some sources the number of keys is not mentioned but we know the keyboard started at bottom C. This is confirmed by the pitch of the stops (8’ or 4’ instead of 6’ or 3’). Because of the early date we might assume these instruments to have had keyboards extending to a” (but omitting g-sharp”). This is nevertheless hypothetical.

Brussel, St. Goedele St. Omer, Notre Dame Leuven, St. Pieter Mechelen/Antwerpen	Jehan Crinon (1538) Jehan Crinon (1545) Jehan Crinon (1556 – ’58) Gieles breebosch (1566) ³⁹	<i>‘...tot elcken claviere moeten zyn drye clavieren meer dan den ordinarys te wetene die octave van cfaut, dsolre ende eelami...’</i>
Arras, Abbey of St. Vaast	Jean Barbaise/Pieter Isoree (1585/1590) ⁴⁰	<i>‘...le clavier portent vingt-six touches et en faincte seize. La devanture sonnera au son de huit piedz comme cell de ladict eglise Nostre-Dame d’Arras...’</i> This seems to indicate a mistake as the number of lower keys fails to correspond with keyboard compasses applied elsewhere. Perhaps 25, rather than 26, keys is the correct number. This would correspond, as would the reported 16 upper keys, to the compass C/E – g”, a” (41 keys).
Gent, St. Baafs Namur, St. Jean-baptiste	Aert de Smet (1592-1595) ⁴¹ Crespin Carlier (1598) ⁴²	<i>‘...dat sal hebben c faut onder f faut’</i> <i>‘Le tout à intonner desseur le faut six pied, C fa ut huit pied’</i>

Paris, Hôpital St. Esprit	Mathieu Langhedul (1602) ⁴³	<i>‘...une alonge au clavier par bas de trios marches qui sont elamy, delasolre, Csolfant...’</i>
Paris, St. Leu – St. Gilles Nivelles, coll. Ste. Gertrude	Mathieu Langhedul (1603) ⁴⁴ Nicolas (II) Royer (1639) ⁴⁵	<i>‘...augmenter (?) à tous les trois notes a sçavoir est E la my, Dé sol ré, Ce fa ut ...’</i>

Pierre Trichet reports in his ‘Traité des Instruments de Musique’ (c. 1640) that spinets, like organs, usually have keyboards with 49 keys⁴⁶. Nevertheless, only a few years before, Mersenne describes a ‘cabinet d’orgue’ with compass C/E – g”, a”: ‘...il a deux rangs de touches...[...]...mais en a que vingt-cinq au premier rang, & seize au second, afin que le Cabinet soit plus petit, & consequemment plus aysé à porter; c’est pourquoy on l’appelle petit Clavier⁴⁷. For practical reasons, the short octave remained popular in house organs. This is the reason that the contract for the house organ to be built by Johannes-Franciscus Posselius for Renier Jénicot le jeune (organist of St. Paul’s in Liège) includes the comment ‘clavier à la grande octave’⁴⁸.

Keyboards of 42 keys: C/E - a” (short octave)

Brussel, St. Elisabeth (monastery)	Nicolas II le Royer (1647) ⁴⁹	<i>‘Clavier a 42 touches’</i>
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Keyboards of 43 keys: C, D, E – g”, a” (broken octave)

Organbuilder Christian Penceler proposed in 1727 to enlarge the keyboard of the organ in the Cathedral of St. Rombout in Mechelen by six keys. He added the notes C-sharp, D-sharp and also extended the treble to c””. ‘...manqueren in ...[...]...het bovenste clauwier ses pijpen...[...]...te weten de tweede en de vierde in het leegh ende de vier clijnste, welck clauwier als int bestaet in 43 pijpen ende saude moeten geaugmentert worden tot 49 pijpen’⁵⁰ Based on this information one can conclude that the ‘original’ compass might have been C, D, E – g”, a”(broken octave). We have to bear in mind that the organ had already been altered by Steffan Cuntz in 1623. Cuntz came from Nürnberg, an area in which keyboards with broken octaves were common⁵¹.

Keyboards of 44 keys: C, D – g”, a” (??)

St. Truiden, O.L.Vrouw	unknown builder ⁵²	According to the contract from (1726) new stops would have 48 pipes. Old stops had to be completed by adding 4 pipes. One can conclude in the former situation the keyboard had 44 keys.
Doornik, kathedraal Rekem (Lanaken), Norbertinessen	Nicolas Lenglet (1665) ⁵³ Florent Hocquet & Hans Goltfuss (1629) ⁵⁴	<i>‘Un bon clavier de quarante quatre touches’</i> <i>‘... le clavij de 44 touche commençant en bas en c sol fa ut à la façon de leur épinette finissant en haut en c...’</i>

There is no reference to this compass in any Southern Netherlands source. The number of 44 keys is usually related to the compass C, D – g”, a” as is found in a surviving harpsichord by Hans Müller (Leipzig) dating from 1537⁵⁵. The organ in the Dom in Würzburg, (built by Jacob Niehoff from Cologne) had the same compass but additionally included g-sharp”⁵⁶.

Keyboards of 45 keys: C/E - c^{'''} (short octave)

The earliest known example of a keyboard instrument with this compass in the Southern Netherlands is a virginal by Joes Karest dating from 1548⁵⁷. Nevertheless this compass's application in organs must have been exceptional in the 16th century. In the first decades of the 17th century both keyboards extending to a^{'''} (although usually without g-sharp^{'''}), as well as keyboards extending to c^{'''} were common.

Parijs, St. Gervais	Mathijs Langhedul (1601) ⁵⁸	
Lier, St. Gommarus	Jan Boemans (1627) ⁵⁹	<i>'...een besunder clauwier....[....]....daertoe voegende noch twee clauwieren meer als ser aende de oude organen zyn, te weten in de hoogste....'</i>
Antwerpen, kath., sacramentskapel	Matheus Langhedul (1628) ⁶⁰	<i>'... een clavier beginnende in cefaut beneden tot cefaut boven t'saemen vyf en viertigh steken'</i>
Brussel, St. Gorik	Jean-Baptiste Marcquet (1628,1629,1634) ⁶¹	<i>'... claviren tot vyfentveertich stecken C onder ende C boven'</i>
Dielegem, abdij	idem (1631) ⁶²	<i>'...een clauwier van been met 45 stecken...'</i>
Oirschot, St. Petrus, positief	Hans Goltfus (1634) ⁶³	<i>'...met vijffentveertich witte elpenbeenen clauwieren ende soo veel stecken beginnende in C sol fa ut ende oock eyndende ...'</i>
Idem, groot orgel	idem (1636) ⁶⁴	<i>'...twee clauwieren van C tot C met de corte octaeven van 45 stecken...'</i>
Leuven, Predikheren	Jan van Weert (1639) ⁶⁵	<i>'.... twee clauwieren, ider 45 toutssen'</i>
Tongeren, O.-L.-Vrouwebasiliek	André Severin (1639) ⁶⁶	Extension of the compass of the Great
Tongerlo, abdij	Hans Goltfuss (1642) ⁶⁷	starting from 'C sol fa ut', ending 'in c sol fa ut'
Rotterdam, Laurenskerk	Hans Goltfuss (1642/45) ⁶⁸	
Watervliet, O.-L.-Vrouwe-hemelvaart	Boudewijn Ledou (1643) ⁶⁹	
Broechem, parochiekerk	Hans Goltfuss (1644/45) ⁷⁰	
St. Truiden, begijnhof	Christian Ancion (1644-46) ⁷¹	
Aarschot, O.L.Vrouw	Jan Bremser (1646) ⁷²	<i>'...clavieren te weten Csolfaut onder en boven....'</i>
Leuven, abdij O.L.V. wijngaard	Hans Goltfuss (1649) ⁷³	<i>'Item de clavier van vyffenviertich stocken beginnende van cesolfaut beneden mette corte octave....'</i>
Kontich, St. Martinus	Hans Goltfuss (1651-54) ⁷⁴	<i>'...een clauwier, mette corte octave, met vijffentveertich stecken beginnende in csolfaut, ende voleijndende in csolfaut....'</i>
St. Gillis Waas, St. Gillis	Jan Bremser (1652) ⁷⁵	<i>'...twee clauwieren eleck met vyfentveertich touchen....'</i>
Opwijk, St. Paulus	Hans Goltfuss/ Jan Dekens (1658) ⁷⁶	<i>'...clauwieren met de corte octave beginnende in cecolfaut tot eccolfaut met 45 stecken en de twee middelste fenten [in de twee middelste, red.?], de-la-sol-re gesneden in den stoel....'</i>
Hoogstraten, St. Catharina	Nicolaas van Hagen (1662) ⁷⁷	<i>'...van de C tot c boven wesende 45 pypen....'</i>
Turnhout, St. Pieter	Jan le Royer (1662) ⁷⁸	<i>'...clauwieren sullen moeten hebben vijffentveertich toetsen'</i>
Lochristi, parochiekerk	Louis de Bis (1663) ⁷⁹	
Brussel, St. Gorik	Franciscus I Noelmans (1668) ⁸⁰	<i>'... clavieren tot vijffentveertich stecken, C onder en C. boven...'</i>

Kortrijk, begijnhof	Pieter Medaert ?? (1678) ⁸¹	
Diksmuide, St. Niklaas	Jan van Belle (1680) ⁸²	'...bestaende tselve clauwier in vyffenveertich toussen'
West-Cappel	Jan van Belle (1683) ⁸³	
Wouw	J. Metzker (1689) ⁸⁴	
Leuven, Begijnhof	Peter Goltfuss (1692) ⁸⁵	'...een nieuw clavier groot vyffenveertich toetsen...'
Mechelen, O.l.V. Hanswijk	P. Munick (1693) ⁸⁶	
Haasdonk, parochiekerk	Jean Baptiste Forceville (1694) ⁸⁷	'...bet groot ofte geheel clavier sal bestaen in 45 stecken...'
Nielles-les-Ardres	Guillelmus van Belle (1696)	compass established on the basis of preserved parts
Hazebrouck, St. Eligius (verbouwing)	Jacobus van Eynde (1697) ⁸⁸	'...clavier van bissebo(o)m in 45 touchen'
Gent, St. Amandsberg	Louis (I) de la Haye (1699) ⁸⁹	'...clauwier van 45 touchen de gheheel van wit ivoir en de swerte alve thoonen...'
Lichtervelde (re-using earlier material)	Jacobus van Eynde (c. 1700??) ⁹⁰	'...bet clavier te verlangben tot veyffenveertigh toutsen...'
St. Truiden, Schurhoven	anoniem, z.j. (17de eeuws) ⁹¹	
Rotselaar, St. Pieter (transformation)	Jan Wauters (1717) ⁹²	'... 45 clauwieren...'
Millegem, O.L.Vrouwkapel	Carolus Dillens (1723) ⁹³	

Keyboards of 47 keys: C, D, E – c''' (broken octave) or C/E – d'''

The keyboard consisting of 47 keys can be associated with two different compasses: C, D, E – c''' or C/E – d'''.

C,D,E - c'''

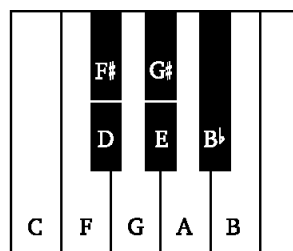
It does not always follow, however, that this compass necessarily corresponds to the 'broken octave' since the arrangement of the keyboard of the organ at Longueville seems to be original.

Gent, St. Niklaaskerk	Nicolaes Langlé (1680) ⁹⁴	'les claviers de deux orgues a Langlese ausi nouveaux contenant quarante et sept touches avec la dieses d effaut et G. solreut en bas montant iusques en C. solfaut en haut'.
Longueville	Goltfuss/Bremser (c. 1670) ⁹⁵	compass established on the basis of preserved parts
Brussel, St. Goedele	Nicolaes a Kempis (c. 1640) ⁹⁶	proposal: '...mede te maeken die Fente van effa ut ende gesolrent, beneden gesneden voer alle beyde clavieren bet welck seer commodeus voer die Musycke sal syn...'
Hypothetical:		
Brugge, St. Jacob (now at Knokke)	Nicolaas Helewoudt (1631) ⁹⁷	

In the contract for a new ‘positief’ in the organ at Oostende (St. Petrus & Paulus) by Vincent Bourne in 1666, we find some interesting remarks concerning the keyboards: ‘... met zyn particulier clavier, ghemaectt à la moderne te weten C solfant boven, en beneden, met d’onderste ghesneeden fenten, naer bees en in (...) ghebruyck, wel verstaende dat het selve clavier sal staen recht onder het opperste clavier vanden grooten orgel’. This description probably relates to a broken octave⁹⁸. Bourne was primarily an organist and only sometimes worked on organs. It is obvious that he underestimated the issues involved; organbuilder Jan van Belle, who had to examine the work carried out by Bourne, quotes that “Bourne aen het clavier vanden cleenen orgel niet [heeft] ghemaectt de finten by contracte naerder gespecificeert ...”⁹⁹

As already stated, the organ at St. Rombout in Mechelen seems to have had a broken octave too. The keyboard extended to g”, a”, hence its earlier mention (see: 43 keys: C, D, E – g”, a”).

A (double) virginal built by Lodewijk Grouwels in 1600 has a broken octave and a compass extending to c””. Since the instrument originally had split keys for d-sharp/e-flat, d-sharp”/e-flat’ and d-sharp”/e-flat” the total number of keys is 50¹⁰⁰.



The broken octave (with sub-semitones)

C/E -d”

Cavaillon, kath.

Bergen, St. Nic. en Havré

St. Truiden, minderbroeders

Charles le Royer (1653)

François Le Royer (1682/83)¹⁰¹

François Le Royer (1686)¹⁰²

‘Engels klavier’

‘...Clawvier 47 toetsen...’

The following step in the evolution towards a completely chromatic bass-octave is ...

Keyboards of 48 keys: C, D - c”

Paris, Augustinian Monastery

Jean Langhedul (1586)

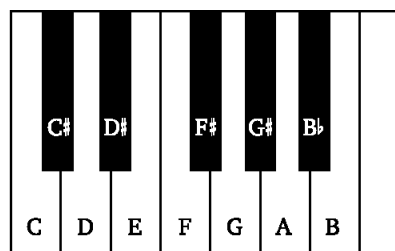
The pedalboard (pull-down) had a complete bottom octave missing only C-sharp. Nothing is known about the treble compass, but based on comparisons, it seems logical to expect a tessitura extending to c””.

Paris, St. Jacques de la Boucherie	Jan Langhedul (1588) ¹⁰³	
Paris, St. Eustache	Mathieu Langhedul (1604)	<i>'...un clavier commenceant en C fa ut en bas, jusques en C sol fa ut en bault, garny de toutes ses feintes, que luy fault jusques à quarente huit marches'</i>
		this compass was used for the Bovenwerk only.
's-Hertogenbosch, St. Jan	Florent II Hocquet (1618) ¹⁰⁴	<i>'... mit ihren semitonis CDDisEFFisGGis'</i>
Rolduc, kloosterrde	Joan Schaede (1627) ¹⁰⁵	<i>'...48 pijpen...'</i>
Hasselt, St. Quintinus	Jan van Weert, (1628) ¹⁰⁶	<i>'...langh clavier met 48 stecken, beginnende in C.sol.fa.ut tot vier octaaven boven in C ut nyt....'</i>
Honselaarsdijk	Hans Goltfuss (1646) ¹⁰⁷	
Cuijk, St. Martinus (originally from Liège)	André Severin (ca. 1650) ¹⁰⁸	
Gent, St. Baafs	Louis Bis & Pierre d'Estrée (1653) ¹⁰⁹	<i>'...ende bestaen in achtendeveertich clavieren oft touches...'</i>
Venlo, St. martinus	André Severin (1659) ¹¹⁰	<i>'Engelsch clavier tot acht en veertich toentsen'</i>
Averbode, abdij	Jan Dekens (1662) ¹¹¹	<i>'Clavij à 4 octaves avec les finctes d'E la my, f. fa ut et g sol re ut em bas....'</i>
Val-St.-Lambert, abdij	Pascal Limbourg (1664) ¹¹²	
Troisvierges, St. André	anonymous (c. 1670) ¹¹³	
Tienen, St. Germanus	Jan Dekens (1671) ¹¹⁴	<i>'...twee clauwieren aen achtenveertich stecken...'</i>
Huy, St. Denis	Remy Ancion (1676) ¹¹⁵	
Philippeville	Blasius Bremser (1678) ¹¹⁶	<i>'quarante huit touche d'ivoir'</i>
Waver, St. Jean-baptiste	Gregoire van Hagen (1680) ¹¹⁷	<i>'...le clavier a l'anglaise et les touches en nombre de 48 de buy ou palame...'</i>
Loenhout, St. Petrus & Paulus	Jean Baptiste Forceville (1683) ¹¹⁸	<i>'Engelsche Clauwieren bestaende in achtenveertigh Touchen...'</i>
Brussel, St. Gorik	Johann Gottfried Bader (1686/87) ¹¹⁹	<i>'een clavier ... [...]... ad longum oft beter te verstant een englnst clavier C D Dis E F Fi[s] G Gis A B H C'</i>
		<i>'...un clavier d'os contenant quarant huit touches...'</i>
Liège, coll. St. Pierre	Philippe II Le Picard (1703) ¹²⁰	<i>'Un clavier de 48 touches...'</i>
Maaseik, Agnieten (monastery)	Philippe II Le Picard (1703) ¹²¹	<i>'...le clavier a 48 touches...[...].un Cornet Echo de 24 touches...'</i>
Gent, S.Salvator (H.Kerst)	Jean Baptiste Forceville (1705) ¹²²	<i>'...acht en veertigh pijpen...'</i>
Velden, St. Andreas	Conradus Ruprecht II (1705/06) ¹²³	<i>'...acht en viertigh pijpen...'</i>
Swalmen, St. Lambertus	Conradus Ruprecht II (1705-15) ¹²⁴	<i>'...acht en veertig touchen...'</i>
Brugge, St. Anna	Jacobus van Eynde (1707) ¹²⁵	
Zinnik/Soignies, St. Vincentius	Jean Lachapelle (1711) ¹²⁶	<i>'Fransch clavier van 48 touchen'</i>
Zoersel	Henricus Pescheur (1712) ¹²⁷	<i>'...deux claviers...[...]...consistants en quarante huits touchés...'</i>
Gent, nieuwenbosch	Louis (I) Delhaye (1713-15) ¹²⁸	<i>'...clavieren op syn engels met achtenveertich touchen...'</i>
Leuven, St. Gertrudis	Christian Penceler (1714) ¹²⁹	<i>'...48 toucheen Engelsch clavier...'</i>
St. Truiden, O.L.Vrouw	Jan Wauters (c. 1717) ¹³⁰	<i>'... een beenen clavier ... [. . .]... bestaende in achtenveertigh....'</i>
Brugge, St. Salvator	Jacobus van Eynde (1719) ¹³¹	<i>'...claviers de quarante huit touches...'</i>
Brugge, O.L.Vrouw	Corneille Cacheux (1721-1724) ¹³²	<i>'... clauwieren van acht en veertigh touchen...'</i>
Oostende, St. Pieter & Paulus	J. Berger (1726) ¹³³	<i>'...achtveertigh pijpen op engels clavier...'</i>
Diest, begijnhof	Christian Penceler (1732) ¹³⁴	

Keyboards of 49 keys: C-c^{'''} (complete chromatic bass octave)

In England the chromatic bass octave was popular very early. The Ruckers workshop made harpsichords specifically for export to England with a complete bass octave. It seems obvious that some organists and composers of English origin, but living in the Southern Netherlands, such as Peter Philips, John Bull, Richard Dering and William Browne may have promoted the extension of the continental short octave...

An example of this English influence is easily recognisable in the project for a new organ in 's Hertogenbosch: In 1617 Albert Kiespenning prepared a proposal for an organ to be built in the Cathedral. Some copies of this proposal have been preserved. Those copies almost entirely correspond to each other, but in one case some written remarks have been added to the text. From the context it is clear that these additions have been made following correspondence with John Bull, organist in Antwerp during the era in question. Precisely because of this background, some information concerning the compass of the keyboard is very interesting: *'... Dit Bardon moet recht uuyt sien, van c solfaut onder tot c solfaut boven, met all de semitooenen ende alle de registers moeten oock in derselver manieren volgen. Het clavier is 29 wit ende 20 swart, gelijk dese nevenstaende forme uuytwijst'*.¹³⁵



Chromatic bass octave

The transition from short octave to chromatic bass octave during the building of an instrument (or shortly thereafter) can be easily recognised in at least two historic organs: the first, a positive organ built by Mathijs (?) Langhedul, is preserved in the Evreux museum, while the second, a positive organ by Apollonius Bosch, is today located in the Domkerk in Utrecht. In both cases, the windchest has been enlarged through the addition of four grooves and four additional rollers for C-sharp, D-sharp, F-sharp and G-sharp.

Antwerpen, kath., sacramentskapel

Matheus.Langhedul (1627)¹³⁶

'... claviren beginnende in cefaut beneden met alle syne fenten, tot 't vierde cefaut boven; inhoudende elk clavier negen en viertig stekken'

Antwerpen, St. Jacob

Peeter Lannoy (1654)¹³⁷

'...claviren onder ende boven onderuet op de engelsche maniere'

Brussel, St. Goedele

Jean-Baptiste Forceville (1706)¹³⁸

'Les claviers seront composés de 49 touches a sçavoir commençant en Ce, sol, ut et finissant en Ce, sol, ut avec toutes les fintes, et B. mol.'

Herenthout, St. Pieter

Christian Penceler (1710-16)¹³⁹

'Engelsche clauwieren volle octaevē...'

Mechelen, St. Rombout

Christian Penceler (1727)¹⁴⁰

'...saude moeten geaugmentert worden tot 49 pijpen'

Neerheylissem, St. Sulpice

Louis Delhayé (c. 1720)¹⁴¹

Brussel, jezuïetencollege
Utrecht, domkerk
Antwerpen, Falcontinnen

Jean-Baptiste Forceville (1736)¹⁴²
Apollonius Bosch (z.j.)¹⁴³
N. van Haeghen (1654)¹⁴⁴

‘twee Engelsche clauwieren’

The extension of keyboard compasses during the first period of the 18th century was primarily promoted by organbuilders of French origin.

Keyboards of 53 keys: C-e”

Kaprijke

Louis de la Haye (1723)¹⁴⁵

‘It. een clavier van 53 toucen te weten tot C. solut met haer diese ofte finte inden bassus, ende tot E. simi boven C. solut inden superius welke toucen gheheel smal moeten sijn op zÿjn fransch om te kunnen een groote thiene grijpen; midtsg. De gebele tonen beleydt met wit been en dhalve met swart ebben hout’

Louis de la Haye came from France and the compass he proposed probably has its roots in his origins, as do the measurements of the keyboard (*‘...toucen gheheel smal...[...]... op zÿjn fransch...’*).

A really revolutionary compass is proposed by Jean-Baptiste Forceville in Antwerp:

Keyboards of 56 keys: GG – d”

Antwerpen, St. Jacob

Jean-Baptiste Forceville (1726/’27)¹⁴⁶

‘Ende den clavier van dese orgel sal moeten wesen gecomponeert van sessenvijftigh touches, beginnende in et re sol d’octave vell leeger als ordinair, ende eijndigen in D la re l’octave veel hooger als d’ordinaire...’

The Positief of the same instrument had a shorter compass, which in itself could already be considered ultra-modern.

Keyboards of 51 Keys: C – d”

Antwerpen, St. Jacob

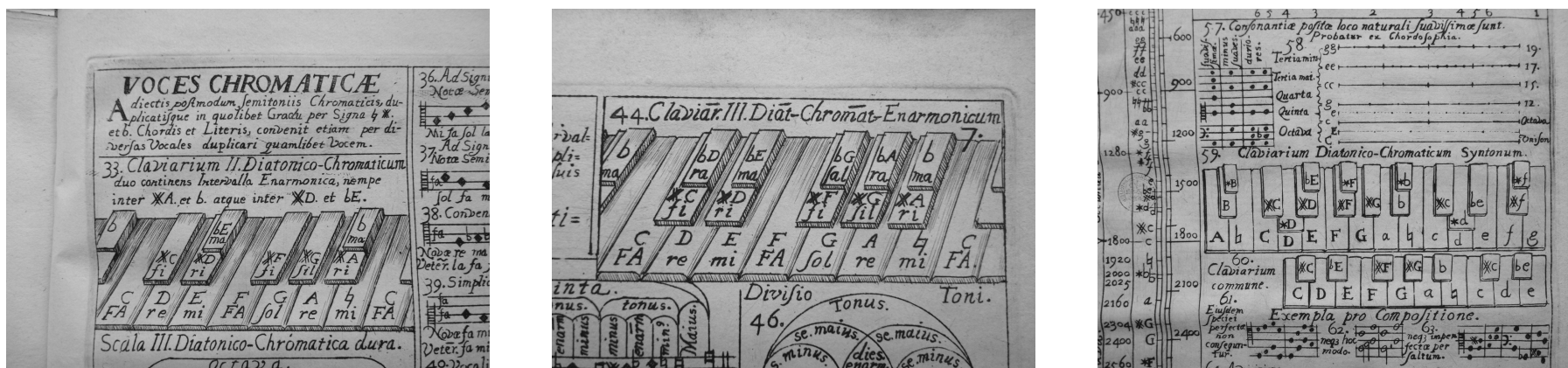
Jean-Baptiste Forceville (1726/’27)¹⁴⁷

‘Een positieff bestaende in eenevijftig toutsen beginnende van de sol fa ut tot de la sol re omboogh te weten van vier octaven & twee toutsen...’

Split keys in the Southern Netherlands

The use of split keys seems to have been rare in Southern Dutch organs. Apart from a description and drawing in: ‘*Den ouden ende Nieuwen grondt van de musiicke*’ (1662) by Jan van der Elst and sources (1626 and 1633) relating to a patent by Jean Gallé, only a few examples are mentioned in documents relating to organs.

Jan van der Elst was an Augustinian monk in Gent and a student of Jehan Titelouze in Rouen. He published on the theory of music and provides an explanation of different tuning systems for keyboard instruments. Furthermore he describes different ways of realising octaves with more than 12 keys in order to achieve pure intervals (‘*Het volmaectt Clauvier Diatonicum Syntonum*’). Certain illustrations are included which provide examples of such keyboards¹⁴⁸.



Some illustrations of keyboards with split keys from Jan van der Elst: ‘*den ouden ende Nieuwen grondt van de musiicke*’ (Gent, 1662)

In November 1626, Jean Gallé, inventor, architect and mathematician from Liège, concluded the negotiations for a contract with organbuilder André Séverin in order to realise a system for transposing on keyboard instruments. This cooperation lasted only for a limited period since Gallé signed a new contract with organbuilder Jacques Boesmans in 1633. In that agreement one can find some explanation of the system in question: ‘... *la façon de faire orgues [,]positives, regales, espinettes et claviers, lesquels ...[...]. se pourront haulser ou abaisser de demi, de un, ou de plusieurs tons avec parfaite harmonye cromatique... [...]. Mais iceluy clavier aura 18 ou 19 touches en un octave, au lieu que l'accord ordinaire ne contient que douze touches...*’¹⁴⁹

Both Van der Elst and Gallé proposed a number of split keys in each octave. Nevertheless split keys were probably only constructed for d-sharp/e-flat and, even then, only in a few instruments. The following documents on the building of specific organs mention split keys:

‘s-Hertogenbosch, St. Jan Paris, St. Nicolas des Champs	Florent II Hocquet (1618) ¹⁵⁰ Crespin Carlier (1632) ¹⁵¹	split keys for es/dis, es’/dis’ en es’’/dis’’ (only in the Rugwerk) split keys for dis/es, dis’/ es’ and dis’’/es’’: ‘... <i>la faincte de myla proche de la clef de faut sera couppée avec son octave en hault et sa quinzième lesquel les marches seront couppées pareillement aux deux clavier et demy...</i> ’
Opwijk, St. Paulus	Hans Goltfuss/Jan Dekens (1658) ¹⁵²	‘... <i>clauvieren met de corte octave beginnende in cecolfaut tot eccofaut met 45 stecken en de twee middelste fenten (in de twee middelste, [??, red.], de-la-sol-re gesneden in den stoel...</i> ’
Brussel, St. Gorik	Franciscus I Noelmans (1668) ¹⁵³	split keys for d-sharp/e-flat. These keys functioned only on the foundation stops and were therefore used only for the accompaniment of singers ‘... <i>delasolré en Elami in de groote orgel, ende in de cleyn orgel moet onder gesneden syn in prestant, holpyp en de fluyt – In de cleyn orgel (sic) holpyp ende fluyt, om mede te singen</i> ’.
Brussel, St. Gorik	Johann Gottfried Bader (1686/’87) ¹⁵⁴	The text in the contract is not very clear. However, it does indicate that some keys on the Rugwerk keyboard were split: ‘ <i>De clavieren op syn Engels waer van het onderste de half toonen ghesneden syn</i> ’

A (double) virginal by Lodewijk Grouwels (1600) may also be relevant in this context. The ‘child’ (ottavino) has disappeared but the keyboard of the ‘mother’ (main instrument) is preserved and has a compass of C, D, E - c^{'''} with broken octave and split keys for d-sharp/e-flat, d-sharp’/e-flat’ and d-sharp’’/e-flat’’¹⁵⁵. In addition there exists a harpsichord by Ioannes Couchet (1652) with the compass GG/BB – c^{'''} with split keys for d-sharp/e-flat (with the exception of E-flat in the bass octave)¹⁵⁶

From the context, it seems that subsemitones were primarily of importance in an accompanimental context. This is equally true, of course, for any facility designed to permit transposition:

In the contract with Pieter Lannoy to build an organ for the cloister of the ‘Norbertinessen’ in Antwerp (1654), the following is stipulated: the ‘*Clauvier...*’ had to be ‘... *langer als ordinarij*’ and that: ‘*Item sal moeten sijn, dat men eenen thoon hooger sal connen spelen naer t’ believe vanden organist*’. The work was carried out under the supervision of Henricus Liberti, organist of Antwerp Cathedral from 1628 until 1669¹⁵⁷.

Nicolaes a Kempis, organist of the church of St. Goedele in Brussel, also indicates his wish to be able to transpose in his plan for changes to the organ: ‘*Item noch een Niew Secreet om eenen toon hooger te spleen tott gerieff van den Musyck als den Sanckmeester ende organist belieft*’¹⁵⁸

Stringed keyboard instruments

It is an obvious step to compare the development of the keyboard compasses of organs with those of harpsichords and virginals. A remarkable number of stringed keyboard instruments from Antwerp (16th – 18th century) have been preserved, investigated and documented. Grant O'Brien has developed a method for analysing the original compasses of harpsichords made in the Ruckers tradition¹⁵⁹.

Single keyboard instruments in general had 45 keys, corresponding to C/E – c^{'''}. In some instruments dating from the late 16th century the treble compass was limited to g^{''}, a^{''} (Hans Ruckers, octave-virginal from 1594 – Berlin, Schloss Köpenick¹⁶⁰) or to a^{''} (Hans Ruckers, virginal from 1584 in Paris, Museum of the Conservatoire N.S.M. nr. E.986.1.2¹⁶¹)

All harpsichords from the Ruckers workshops with two keyboards were conceived as 'transposers': the keyboards were tuned a fifth apart from each other and were not intended to be used together. Furthermore, both keyboards used the same strings. In some early instruments (for example an anonymous undated harpsichord (c. 1580) in the Brussels Museum of Musical Instruments, nr. 2934¹⁶² and an instrument by Hans Ruckers, 1599, in the Händelhaus, Halle¹⁶³) the compass of the upper keyboard is: C/E – a^{''}, while the lower keyboard has C/E – d^{'''}. During the first half of the 17th century, however, the most common compasses were as follows: upper keyboard: C/E – c^{'''}, lower keyboard: C/E – f^{'''}. Single-manual harpsichords usually had a compass of C/E – c^{'''}¹⁶⁴.

During the 16th and the 17th centuries Flemish instruments already enjoyed a reputation throughout Western Europe. Grant O'Brien points out that the compass of instruments to be built for export to England or France was modified by the Ruckers family. The chromatic bass-octave seems to have been a hallmark for harpsichords destined for England¹⁶⁵, whilst instruments intended for export to France were 'transposers' with the compasses F – f^{'''} (upper keyboard) and GG – c^{'''} (lower keyboard). Grant O'Brien refers to these as 'french doubles'¹⁶⁶.

The Pedalboard and its compass

In Southern Dutch organs the Pedal was, in general, only of minor interest. Only in a few cases do we find an independent division and these examples seem to have been related to 'foreign' influences. In general the pedalboard was only a pull-down (coupled to the HW) and the compass was limited to one, or one and a half, octaves.

The large Pedal division in Rotterdam (Goltfuss, 1642/45) might have been the result of (Northern) Dutch influences. Nevertheless independent pedal divisions were realised in other instruments as well (for example Antwerp – St. Paulus, built by Nicolaas van Hagen, 1654 and Brussel – St. Gorik, built by Johann Gottfried Bader, 1686/'87)

Paris, Augustinian monastery	Jean Langhedul (1586) ¹⁶⁷	'...Item fault fere ung clavier de pédalles lesquelles ne feront que tirer le clavier depuis C fa ut a bas jusques a son octave, avec les fainctes qui sont en tout unze marches...'
Trier, dom	Florent Hocque sr (1590-1594) ¹⁶⁸	C, D, E, F, G, A – b-flat (pull-down to HW, and a Trompet 16')
Paris, St. Gervais	Mathijs Langhedul (1601) ¹⁶⁹	9 keys (C, D, E, F, G, A – c)
Paris, house organ Fleurand Bienvenu	Florent Hocquet II (1605) ¹⁷⁰	9 keys (C, D, E, F, G, A – c ???)
's Hertogenbosch, St. Jan	Florent Hocquet II (1618) ¹⁷¹	C, D – d' (26 keys), from F coupled to FF (ie one octave lower) of the manuaal.
Lebbeke, O.L.Vrouw	Jan van Weert (1626) ¹⁷²	'...ende pedael van vierthien clauwieren... (in other words: C/E – f)
Lier, St. Gommarus	Jan Boemans (1627) ¹⁷³	'...acht, tien oft twelf pedalen, soo den organist dat geraden vindt...'
Antwerpen, kath., sacramentskapel	Matheus.Langhedul (1627) ¹⁷⁴	'... pedael tot den number van vyffthien luttel min of meer naer goeddkunkene van Doctor Bol...'
Brussel, St. Goedele	Nicolaes a Kempis (c. 1640) ¹⁷⁵	[proposal:] 'Item een pedael a part beginnende van C sol fa ut beneden tott die 2 faut'
Tongerloo, abdij	Hans Goltfuss (1642) ¹⁷⁶	'een appart pedael van 9 clavier' (C/E – c)
Rotterdam, Laurens	Hans Goltfus (1642/45) ¹⁷⁷	'... Sall het pedaell hebben 25 stecken met de lange octaeff beginnende in C. D. E. F. F#. G. G#. endesoovorts tot d la-sol-re....' (C,D,E - d')
Honselaarsdijk,	Hans Goltfuss (1646) ¹⁷⁸	'Dat klavier sal men pedaliter gebruycken tot het tweede E.la.my'
Gent, St. Baafs	Louis Bis & Pierre d'Estree (1653)	C, D, E – d (?) ¹⁷⁹
Antwerpen, St. Jacob	Peeter Lannoy (1654) ¹⁸⁰	'Ende de pedalen sullen wesen gecoppelt aen het opperste clavier totten tweeden allamire...'
Opwijk, St. Paulus	Hans Goltfuss/ Jan Dekens (1658) ¹⁸¹	'...het bovenste clauwier aengehangen tot het tweede cecolfaut, pedaliter te gebruycken'
Tienen, St. Germanus	Jan Dekens (1671) ¹⁸²	'...een pedael aenhangende een octave...'
Longueville	Hans Goltfuss/Jan Bremser (c. 1670) ¹⁸³	C, D, E – c (no short octave)
Waver, St. Jean-baptiste	Gregoire van Hagen (1680) ¹⁸⁴	'...pedale de quatorze touches...' [probably C, D – d]
Liège, coll. St. Pierre	Philippe II Le Picard (1703) ¹⁸⁵	'...un clavier particulier de pedalled contenant dix sept touches...'
Swalmen, St. Lambertus	Conradus Ruprecht II (1705-15) ¹⁸⁶	'...een pedael van seventhien claviere....'

Brussel, St. Goedele	Jean-Baptiste Forceville (1706) ¹⁸⁷	<i>'Tous les jeux ou registres qui se touchent en pedales seront composés des deux plus basses octaves completes scavoir commençant en C sol, Ut, et finissant pareillem(en)t en C, Sol, Ut, avec toutes les feintes et B mol a la reserve de la feinte de C, Sol, Ut, en bas ce qui sera que les pedals seront en nombre de 24, c'est a dire qu'ils comprendront 24 touches'</i>
Zinnik/Soignies, St. Vincentius	Jean Lachapelle (1711) ¹⁸⁸	C, D – f, g (18 keys)
Antwerpen, St. Jacob	Jean-Baptiste Forceville (1726/'27) ¹⁸⁹	<i>'...d'orgel pedal ...[...]...welckers clavier gecomponceert moet worden van vierrentwintigh touches...'</i> [C, D – c' like in Brussel, 1706??]
Mechelen, St. Rombout	Christian Penceler (1727) ¹⁹⁰	C – e (?)

Not before 1727 did Jean-Baptiste Forceville propose adding the notes C-sharp, D-sharp, F-sharp and G-sharp to the pedal of the organ in Antwerp Cathedral! This in order to have the same compass (in the bass) as the HW: *'Il y faut ... quatre touches aux Basses.... On y devra aussi ajouter les quatre diezes aux basses, savoir les diezes de C.D.F.G. pour avoir la pédale dans ses basses conforme à la grande Orgue'*¹⁹¹.

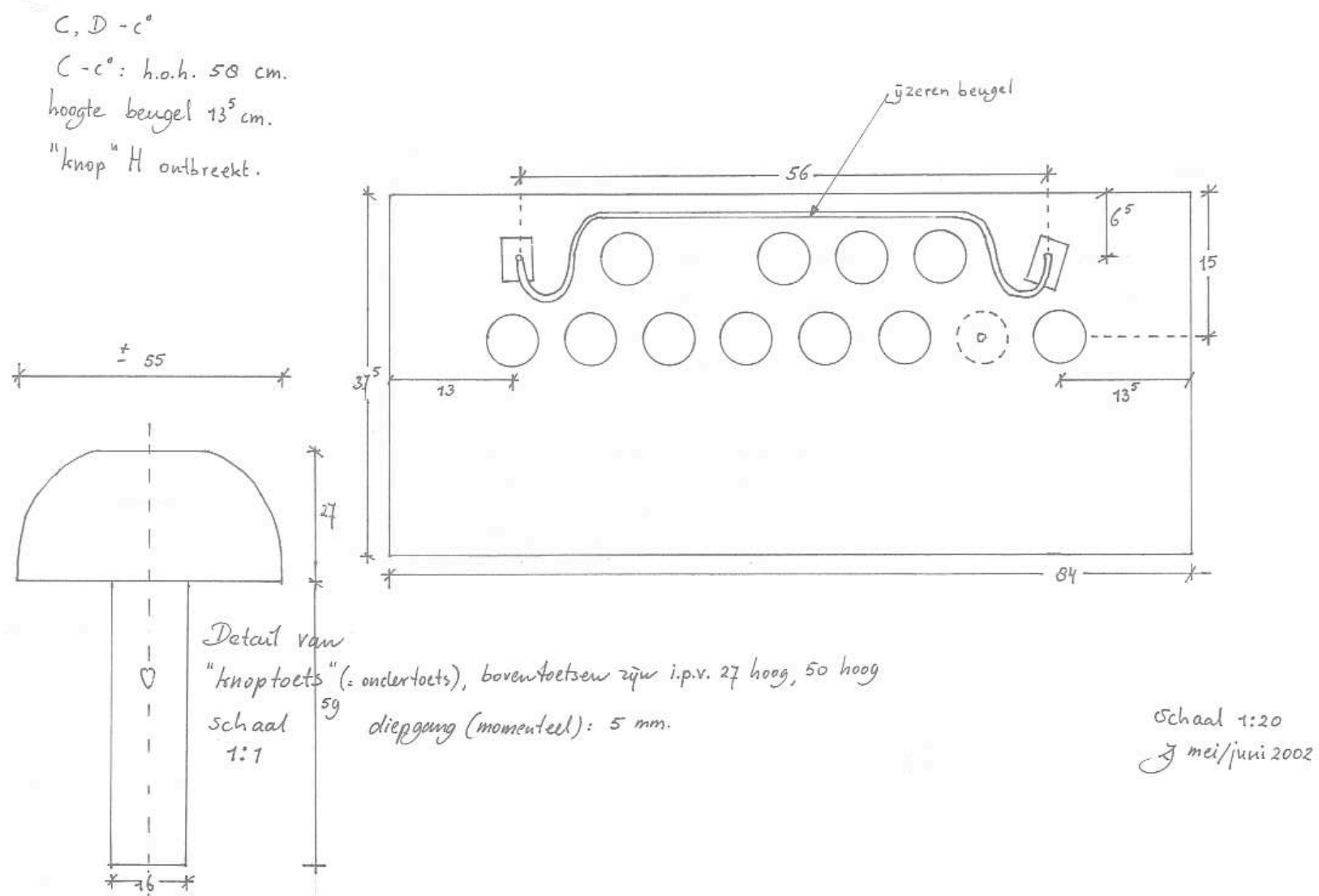
The pedalboard

The shape of the pedalboard and its keys was far from uniform in the Southern Netherlands. Apart from the 'German' keyboard, probably used in larger pedal divisions (for example 's Hertogenbosch, Rotterdam), we can still see the original pedals preserved in Longueville (Goltfuss/Bremser, c. 1670) and the rare stud pedals (knobs in the shape of mushrooms) in Horpmaal (Jan Dekens, 1675). The model, used especially during the 18th century, of the French pedalboard with quite 'big' keys, may already have existed in the 17th century.

Johan Zoutendijk, September 2010

Appendix

Drawing of the pedalboard in the organ at Horpmaal (Jan Dekens, 1675)



Notes

- ¹ Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 215
- ² Idem, p.218, 530-534 (m.n. 532), the opinion of the author is based on an inventory of the historic pipework.
- ³ Vente, Maarten Albert: 'Proeve van een repertorium van de archivalia betrekking hebbende op het Nederlandse Orgel en zijn makers tot omstreeks 1630', 1956, p. 115-117. From the proposals by Hans Boemans and Philips Snoeck, one can conclude that the keyboard started at F.
- ⁴ Vente, Maarten Albert: 'Utrechtse orgelhistorische verkenningen – bijdragen tot de geschiedenis der orgelcultuur in de Lage Landen tot omstreeks 1630', 1989, p.76
- ⁵ Few years ago such a situation has been reconstructed in the Van Hagerbeer-organ at Leiden, Pieterskerk (1643)
- ⁶ Vente, Maarten Albert: 'Utrechtse orgelhistorische verkenningen – bijdragen tot de geschiedenis der orgelcultuur in de Lage Landen tot omstreeks 1630', 1989, p.76
- ⁷ idem
- ⁸ idem
- ⁹ idem
- ¹⁰ Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 214
- ¹¹ Harst, J.J. van der: 'Het grote orgel in de kathedrale basiliek van St. Jan te 's-Hertogenbosch 1617-1980, unpublished study, 1980, p. 34 en: Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 559
- ¹² Thimus, Pierre, Guido Schumacher, Koos van der Linde: 'Orgues – Eglise Saint-Jacques de Liège', 1998, p. 17
- ¹³ Meeüs, Nicolas: 'De oorsprong van het kort octaaf' in: 'Orgelkunst' 1983, nr. 1, p. 3-12. A version in French entitled: 'L'origine de l'octave courte' is available online at: paris-sorbonne.academia.edu/NicolasMeeüs/Papers
- ¹⁴ Brien, Grant O': 'Ruckers – A harpsichord and virginal building tradition', 1990, p. 220
- ¹⁵ Vente, Maarten Albert: 'Utrechtse orgelhistorische verkenningen – bijdragen tot de geschiedenis der orgelcultuur in de Lage Landen tot omstreeks 1630', 1989, p. 78
- ¹⁶ This seems to indicate a mistake as the number of lower keys fails to correspond with keyboard compasses applied elsewhere. Perhaps 25, rather than 26, keys is the correct number. This would correspond, as would the reported 16 upper keys, to the compass C/E – g", a" (41 keys). It is worthy of comment that Vente fails to remark on this interpretation problem but, on the other hand, does assume that the instruments of Crinon, just as with Barbaise/Isorée organ in Arras, were equipped with 41-note manuals.
- ¹⁷ Deschrevel, A.: 'Het Crinon-orgel (1554) in de Sint-Pieterskerk te Leuven' in: 'De Praestant', 1971, nr.4, p. 82, 83
- ¹⁸ idem, p. 81,82
- ¹⁹ Michel de Bock, one of the organists at the Spanish Court, tried to sign a contract with Crinon on the recommendation of Antonio de Cabezón. See: Wyly, James & Susan Tattershall: 'The Brebos Organs at El Escorial', 2007, p. 12
- ²⁰ Persoons, Guido: 'De orgels en de organisten van de Onze Lieve Vrouwkerk te Antwerpen van 1500 tot 1650', 1981, p. 160. This organ was built for the church of O.L.Vrouw-over-de-Dijle in Mechelen, but was later installed in the main church (O.L.Vrouwkerk) in Antwerp.
- ²¹ Felix, Jean-Pierre: 'Un process à propos d'un orgue du facteur Pierre de Lathour, d'Andenne, pour le couvent de Saint-Victor à Huy (1646-48)' in: 'Mélanges d'Organologie' IV, p.184
- ²² Delahaye, Etienne & Jean-Pierre Felix: 'Les orgues de l'église St. Eloi à Hazebrouck du XV^e au XVII^e siècle – Charles Waghers, Louis de Halen, Pierre et Louis Isorée, Jacobus van Eynde' in: 'Mélanges d'Organologie' VIII, p. 89, 98. In the contract for changing the organ in 1697, it is mentioned that the chest has to be enlarged in order to add four extra keys. Since the case and construction of the instrument were not profoundly changed on that occasion, one can conclude that this enlargement concerns the notes g-sharp", b-flat", b" and c"".
- ²³ Felix, Jean-Pierre: 'Orgues, organistes et maîtres de chapelle de l'église SS.-Pierre et Paul à Ostende (XVI^o – XX^o s.)' in: 'Mélanges d'organologie' III, 1981, p. 12, 56
- ²⁴ Persoons, Guido: 'De orgels en de organisten van de Onze Lieve Vrouwkerk te Antwerpen van 1500 tot 1650', 1981, p. 160. This organ was built for the church of O.L.Vrouw-over-de-Dijle in Mechelen, but was later installed in the main church (O.L.Vrouwkerk) in Antwerp.

- ²⁵ Ghielmi, Lorenzo: 'Contributo per una storia degli organi del santuario di Santa Maria dei miracoli presso San Celso in Milano' in: 'L'Organo, anno XXII, gennaio-dicembre 1984, p. 16
- ²⁶ Soon after their construction, the organs were described in a 'Declaración'. In it is mentioned that certain stops have 41 pipes. Unfortunately the drawings are not very reliable. The 'Declaración' has been published in: Wyly, James & Susan Tattershall: 'The Brebos Organs at El Escorial', 2007.
- ²⁷ Degrutère, Marcel: 'Leonard de Cleves (ou Van Cleven, Van Cleef) à Rouen' in: 'Connaissance de l'orgue' nr. 81, 1992, nr. 1, p. 13 e.v.
- ²⁸ Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 295, 296
- ²⁹ Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 217, 477-480(especially 478).), the opinion of the author is based on an inventory of the historic pipework.
- ³⁰ Streulens, Herman: 'Het Petrus Johannes de Volderorgel in de St.-Michielskerk te Gent' in: 'Orgelkunst' 2005, nr. 2, p. 72
- ³¹ Vente, Maarten Albert: 'De orgels van de St. Lambertuskerk te Helmond' in: 'Brabantia' 4^e jrg., nr.8, aug. 1955, p. 197, 198
- ³² Harst, J.J. van der: 'Het grote orgel in de kathedrale basiliek van St. Jan te 's-Hertogenbosch 1617-1980, 1980, p. 4 en: Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 303, 304
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- ¹⁵⁰ Harst, J.J. van der: 'Het grote orgel in de kathedrale basiliek van St. Jan te 's-Hertogenbosch 1617-1980, unpublished study, 1980, p. 34
- ¹⁵¹ Hardouin, Pierre: 'Le Grand Orgue de Saint Nicolas des Champs', 1977, p. 35
- ¹⁵² Lindemans, Jan: 'Geschiedenis van Opwijk' (1937) geciteerd in: Fauconnier, A. & P. Roose: 'Het historisch orgel in Vlaanderen' deel IIa, 1975, p. 259
- ¹⁵³ Felix, Jean-Pierre: 'Orgues, organistes et maîtres de chant de l'ancienne église St. Géry à Bruxelles', 2000, p. 100
- ¹⁵⁴ Idem, p.107
- ¹⁵⁵ Kosten, John: 'The mother and child virginal an its place in the keyboard instrument culture of the sixteenth and seventeenth centuries' in: 'Colloquium – Ruckers klavecimbels en copieën: universele instrumenten voor de interpretatie van de muziek uit Rubens tijd', gepubliceerd door J. Lambrechts-Douillez, 1977, p. 84-86.
- ¹⁵⁶ Brien, Grant O': 'Ruckers – A harpsichord and virginal building tradition', 1990, p. 182
- ¹⁵⁷ Persoons, G.: 'De orgels en organisten van de Onze Lieve Vrouwe kerk te Antwerpen van 1500 tot 1650', 1981, p. 99... Because of the meantone-tuning, a transposition at the interval of a tone may have led to problems. Nevertheless this case is not unique as Hans Ruckers built a transposing harpsichord using the same transposition. In addition, the Hans Müller harpsichord from 1537 also allows for transposing up or down one tone. The consequences of this rare transposition have been analysed by Grant O'Brien ('Ruckers – A harpsichord and virginal building tradition, 1990, p. 293); in quarter-comma meantone tuning the double function of e-flat/c-sharp and b-flat/g-sharp leads to 'conflicts'.
- ¹⁵⁸ Potvlieghe, G.: 'Zuidnederlandse orgeladviseurs en hun invloed op de ontwikkeling van de orgelbouw in de zeventiende eeuw' in: 'De Mixtuur' nr. 8 (1972), p. 140
- ¹⁵⁹ Idem, chapter 8: 'The determination of the original compass, disposition and pitch of Ruckers harpsichords', p.172-182
- ¹⁶⁰ Idem, p. 178, 239
- ¹⁶¹ Idem, p. 178, 237, 238
- ¹⁶² Idem, p. 29-32
- ¹⁶³ Idem, p. 177, 178, 240, 241
- ¹⁶⁴ Idem, p. 176

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- ¹⁶⁶ Idem, p. 180, 181
- ¹⁶⁷ Vente, Maarten Albert: 'Bouwstoffen tot de Geschiedenis van het Nederlandse orgel in de 16^{de} eeuw', 1942, p. 193
- ¹⁶⁸ Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 295, 296
- ¹⁶⁹ Hardouin, Pierre: 'L'orgue de St. Gervais à Paris', 1996, p. 8
- ¹⁷⁰ Biezen, Jan van: 'Het Nederlandse orgel in de Renaissance en Barok, in het bijzonder de school van Jan van Covelens', 1995, p. 294.
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- ¹⁷² Gerits, T.J. O.Praem: 'Nieuwe vondsten over Brabantse orgelmakers (XVIIde – XIXe eeuw)' in: 'Eigen Schoon en De Brabander', jan./febr. 1968, p. 85
- ¹⁷³ Vente, Maarten Albert: 'Proeve van een repertorium van de archivalia betrekking hebbende op het Nederlandse Orgel en zijn makers tot omstreeks 1630', 1956, p. 120
- ¹⁷⁴ Persoons, Guido: 'De orgels en organisten van de Onze Lieve Vrouwekerk te Antwerpen van 1500 tot 1650', 1981, p. 199
- ¹⁷⁵ Potvlieghe, G.: 'Zuidnederlandse orgeladviseurs en hun invloed op de ontwikkeling van de orgelbouw in de zeventiende eeuw' in: 'De Mixtuur' nr. 8 (1972), p. 140
- ¹⁷⁶ Kreps, Dom. Jozef: 'Het orgel in Tongerlo 1436-1933', 1933, p.39
- ¹⁷⁷ Enschedé, J.W.: 'Het orgel in de St. Laurenskerk in 1642 aanbesteed aan den orgelmaker Hans Goltfus' In: 'Rotterdamsch jaarboekje 1911, p. 170
- ¹⁷⁸ Vlam, C.C. & M.A. Vente (red.): 'Bouwstenen voor een geschiedenis van de toonkunst in de Nederlanden' 2, 1971, p. 140
- ¹⁷⁹ According to the sources the Pedal of the organ would have 9 naturals and 4 sharps. In my opinion the compass and arrangement of the keys can be deduced from the number of naturals: C, D, E, F, G, A, H, c, d. Of course, my choice of arrangement for the sharps F-sharp, G-sharp, B-flat and c-sharp is hypothetical but seems to me to be plausible.
- ¹⁸⁰ Persoons, G.: 'De orgels en organisten van de Antwerpse Onze Lieve Vrouwekerk van 1500 tot 1650', 1981, p. 209 of: Stellfeld, J.A.: 'Bronnen tot de geschiedenis der Antwerpsche Clavecimbel- en orgelbouwers in de XVIe en XVIIe eeuwen', 1942, p. 72
- ¹⁸¹ Lindemans, Jan: 'Geschiedenis van Opwijk' (1937) geciteerd in: Fauconnier, A. & P. Roose: 'Het historisch orgel in Vlaanderen' deel IIa, 1975, p. 260
- ¹⁸² Doperé, Frans: 'Contract met Jan Dekens voor de vernieuwing van het orgel van de Sint-Germanuskerk te Tienen (1671)' in: 'Orgelkunst' 1993, nr.1, p. 12
- ¹⁸³ Couvreur, Bertrand, Jean-Pierre Felix and Roland Servais: 'L'orgue historique de Longueville', z.j., p. 26
- ¹⁸⁴ Felix, Jean-Pierre: 'L'ancien orgue Grégoire van Hagen de l'église St. Jean-Baptiste' in: 'Wavriensia' jrg. XXXVIII, 1989, nr.1, p. 7
- ¹⁸⁵ Felix, Jean-Pierre: 'L'ancien orgue Philippe II Le Picard de la collégiale St-Pierre à Liège (1703)' in: 'L'Organiste' nr. 144, oct/nov/dec. 2004, p.150
- ¹⁸⁶ Dijk, Rogér van: 'De Roermondse geschiedenis van het orgel' in: 'Eenen schoonen orgel.... – Het Ruprecht-orgel in de Tuindorperkerk te Utrecht', 2000, p. 35
- ¹⁸⁷ Felix, Jean-Pierre: 'Les orgues monumentales de Jean-Baptiste Forceville à la collégiale SS. Michel et Gudule à Bruxelles (1706-1723)' in: 'L'Organiste' XV, 1983, nr. 2, p. 83
- ¹⁸⁸ Felix, Jean-Pierre: 'Les facteurs d'orgues Lachapelle de Thuin' in: 'Mélanges d'Organologie' IX, 1999, p. 12, 47
- ¹⁸⁹ Ferrard, Jean: 'Etude préliminaire de l'orgue de l'église Saint-Jacques à Anvers – état provisoire au 1er octobre 1990' in: Lambrechts-Douillez, J. (red.): 'Mededelingen van het Ruckers-Genootschap – VII: Orgels in Antwerpse kerken – St. Jacobs, Carolus Borromeus, St. Paulus, 1991, p. 20
- ¹⁹⁰ In the contract for work on the organ in St Rombout's in Mechelen to be executed by Christian Penceler in 1727, a bombarde with a compass of 17 keys (C – e ?) is mentioned. From the sources it is not clear if this reed stop is on the manuaal or on an independent Pedal division. Whatever its location, the compass of this stop might be an indication of the compass of the pedalboard as well.
- ¹⁹¹ Kreps, Jozef: 'Het orgel in Tongerlo – 1436-1933', Tongerlo, 1933, p.37, refers to: SAA, Bundel O.L. Kerk. Orgel. 'Aen mijne Heeren der Magistrature... Projet de l'augmentation de la Grande Orgue de la cathédrale d'Anvers pour la rendre parfaite).