The American Institute of Organbuilders

2022 Annual Convention
Atlantic City, New Jersey

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THE FORTY-EIGHTH NATIONAL CONVENTION
of
THE AMERICAN INSTITUTE OF ORGANBUILDERS

ATLANTIC CITY, NEW JERSEY
October 9–13, 2022

THE ORGANBUILDER'S COMPANION

for the cities of

ATLANTIC CITY *and* PHILADELPHIA

Scot L. Huntington
Editor and Compiler

Mark Hotsenpiller
Program Editor

The American Institute of Organbuilders
Grass Valley, California
2022

THE AMERICAN INSTITUTE OF ORGANBUILDERS
Grass Valley, California

PUBLISHED IN THE UNITED STATES BY THE AMERICAN INSTITUTE OF ORGANBUILDERS

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Mark Hotsenpiller: PROGRAM EDITOR

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AUTHORSHIP: Scot Huntington is the author of the ancillary material in the documentation section, except for the essays identified by their individual authors.

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THIS BOOK IS DEDICATED TO

Emerson Lewis Richards
(1884–1963)

Organ Architect, Organ Reform Trailblazer,
Former Governor of New Jersey and State Senator

Atlantic City Convention Committee

Nathan Bryson, CHAIR

Scott Banks, Dennis Cook, Chuck Gibson,
Carl Hersom, James Martin, Nick Myers

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Andrew Forrest, John Panning, Manuel Rosales, Joel Van der Zee
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Convention Overview Committee

Stephen Spake, CONVENTION CO-ORDINATOR

Mark Hotsenpiller, EXECUTIVE SECRETARY
Brad Jones, EDUCATION COMMITTEE CHAIR
Charles Kegg, TREASURER

A special eleven-car train transports the World's Largest Organ from St. Louis to Philadelphia, 1909.

THE AIO CONVENTION IN ATLANTIC CITY COMES AFTER A TWO-YEAR COVID hiatus. Our return to assembling as an organbuilding community lends further importance to what is already a milestone occasion for the organization. Between 1923 and 1933, momentous organ history was made here, the rediscovery of which today, brings American organbuilders on pilgrimage. This moment requires some marker of permanence, to both serve as an educational tool in the language of organbuilders with which to inform their experience with these instruments, and hopefully too, as a reference tool for future builders and researchers. While the AIO has published several organ-documentation studies in the past, this effort proved an undertaking of a higher order. The scale of this publication also represents a first for the Institute as it commemorates this landmark convention event.

I would like to extend my sincere appreciation to the following for their invaluable assistance and contributions: Jonathan Ambrosino, Austin Organ Co., Ray Biswanger, Nathan Bryson, Jerome Butera and *The Diapason,* Steve Emory, Carl Hersom, Mark Hotsenpiller, Charles Kegg, Allen Kinzey, Len Levasseur, Ric Morrison, Nick Myers, Bynum Petty and the American Organ Archives, David Pike and the Fisk Organ Co., Stephen L. Pinel, Rollin Smith, Mathew Taft, Bryan Timm, and William Van Pelt.

— Scot Huntington, EDITOR

NOMENCLATURE: The European standard for note and key compass nomenclature is used throughout this book. When citing harmonic numbers, the Pedal pitch basis is 16′ and the manual is 8′, for pitch No. 1.

CCC (32′), CC (16′), C (8′), c^0 (4′), c^1 (2′), c^2 (1′), c^3 (½′), c^4 (¼′), etc.

ORGAN NUMBERING: Every effort has been made to use the numbering nomenclature specific to each firm's usage, and to avoid the ubiquitous and often incorrect use of "Opus" where not specifically appropriate. Aeolian-Skinner continued the use of "Organ No." on contract and engineering documents from Skinner, and for consistency is the term used for their instrument documentation in this book. Internally, they would often refer to an instrument only by its three-digit number, using the word "Opus" occasionally in correspondence and on the signature plates. In Aeolian-Skinner's case, either term is correct, and they can be used interchangeably.

THE PRIMARY TYPEFACES USED IN THIS PUBLICATION ARE GARAMOND PREMIER PRO AND FUTURA.

Garamond Premier Pro was designed by Robert Slimbach on the model of the roman types of Claude Garamond and the *italic* types of Robert Granjon.

Futura is a geometric sans-serif typeface designed by Paul Renner and released in 1927.

SPONSORS AND ADVERTISERS

THE AMERICAN INSTITUTE OF ORGANBUILDERS AND THE AIO PUBLICATIONS COMMITTEE WOULD LIKE TO THANK THE ADVERTISERS, AND THE FOLLOWING FIRMS AND INDIVIDUALS FOR THEIR GENEROUS SPONSORSHIP OF THIS PROJECT.

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ADVERTISER DIRECTORY

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AIO STRUCTURE

- Board members are responsible for communicating with the first committee in their columns.
- Committees are chaired by the first person listed.
- Board and some committee terms expire following the annual convention in the year listed.

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Receive and review nominations for membership, recommend action to board. Seek new members, recommend action regarding inactive members

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Review by-laws, minutes of board and annual meetings. Review proposed amendments to the Bylaws

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EDUCATION
Administer training programs, plan educational content of conventions and mid-year seminars

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CARL HERSOM
SCOT HUNTINGTON
MATT PARSONS

CONVENTION OVERVIEW
Hold annual review session to evaluate previous convention. Help new convention committees with organization and hotel negotiations

STEPHEN SPAKE COORDINATOR
MARK HOTSENPILLER
BRAD JONES
CHARLES KEGG

WEBSITE RESOURCES
Develop a comprehensive online website resource for pipe organ service information

BILL LANDOLINA
RYAN BOYLE
MARK HOTSENPILLER
DEREK VERVEER
BENJAMIN YOUNG

NOMINATING
Select candidates for the annual election

2022
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ABOUT THE AIO

THE INSTITUTE

THE AMERICAN INSTITUTE OF ORGANBUILDERS IS AN EDUCAtional organization dedicated to advancing the art of organbuilding "by discussion, inquiry, research, experiment, and other means." AIO members are professional organbuilders, service technicians, and suppliers who subscribe to the Institute's objectives and its Code of Ethics.

In 1973, a group of organbuilders met in Washington, D.C. to explore the possibility of forming a professional association. A provisional board was established, and a constitution committee was appointed. In September 1974, a convention was held in Dayton, Ohio, which adopted a constitution and bylaws, signed charter members, and elected a Board of Directors. Since that time, conventions have been held each year in cities throughout the United States and Canada. These meetings are structured around a full schedule of technical lectures, visits to local organ shops and instruments, product exhibits, and business meetings. The opportunity to meet other builders, technicians, and suppliers to share ideas and information is another important benefit of each convention.

AIO midyear seminars provide further opportunities for professional growth. These weekend seminars are held in shops throughout the country and are structured to provide hands-on training in a variety of small group settings.

JOURNAL OF AMERICAN ORGANBUILDING

THE INSTITUTE ALSO PUBLISHES A QUARTERLY JOURNAL FEATURing technical articles, product and book reviews, and a forum for the exchange of building and service information and techniques. Subscriptions are provided free to AIO members and are available to non-members through the main office at $35 per year, or $90 for three years.

MEMBERSHIP

AIO MEMBERSHIP IS OPEN TO THOSE CURRENTLY ENGAGED IN full-time organbuilding or organ maintenance work. Affiliate membership is open to those who are not full-time builders or technicians, as well as non-North American builders and those in allied professions supporting the pipe organ industry. Prospective members must obtain the nominating signature of a current AIO member and provide a brief summary of their work history on the nomination form. Further details about membership categories and annual dues are provided on the form.

WEBSITE

THERE ARE SEVERAL AIO RESOURCES AVAILABLE ONLINE AT www.pipeorgan.org. The membership roster includes links to the websites of companies employing individual AIO members. Members can change personal contact information at any time, as well as search for information of AIO colleagues, by signing into their individual accounts. Past and present convention information, seminar descriptions, past copies of the AIO *Journal*, and a copy of the membership application can also be found here. Enquiries may be made of the Executive Secretary :

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415.385.8204
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WWW.PIPEORGAN.ORG

ON THE COVER

Vintage Postcard of the Auditorium and Convention Hall, Atlantic City, New Jersey *circa* 1929.

WELCOME

AIO 2022 CONVENTION

Atlantic City, New Jersey

HEADQUARTERED AT

Sheraton Atlantic City Convention Center Hotel

TWO CONVENTION BOULEVARD
ATLANTIC CITY, NEW JERSEY 08401

(609) 344-3535

WELCOME TO ATLANTIC CITY

ATLANTIC CITY IS A RESORT CITY ON NEW JERSEY'S ATLANTIC coast that is known for its many casinos, wide beaches, and iconic Boardwalk. Established in the mid-1800s as a health resort, today the city is dotted with glitzy high-rise hotels and nightclubs. In addition to gambling at slot machines and table games, the casinos offer spa treatments, performances by famous comedy and music acts, and high-end shopping.

Atlantic City inspired the U.S. version of the board game Monopoly, especially the street names. Since 1921, Atlantic City has been the home of the Miss America pageant. In 1976, New Jersey voters legalized casino gambling in Atlantic City. The first casino opened two years later.

Please note that the convention hotel does not have a casino or gambling of any sort on its premises.

CONVENTION HOTEL

THE CONVENTION WILL BE HELD AT THE SHERATON ATLANTIC City Convention Center Hotel, Two Convention Boulevard, Atlantic City, NJ 08401 - (609) 344-3535. The New Jersey Transit Atlantic City Rail Terminal is located within the same complex as the hotel. Sheraton Atlantic City Convention Center Hotel is a completely nonsmoking and pet-friendly hotel with a state-of-the-art fitness center, an indoor swimming pool, and a seasonal outdoor hot tub.

WEATHER

WEATHER ON THE JERSEY SHORE IS HIGHLY SOUGHT AFTER due to its moderate temperatures–typically 10 degrees cooler than the mainland in the summer and 10 degrees warmer in the winter. September and early October are often referred to as "local's summer" as the crowds have gone, but the weather is still enjoyable. Highs are typically in the mid-60s and lows in the 50s. There will be some walking to and from Boardwalk Hall, so plan to bring an umbrella or rain jacket just in case!

HOTEL PARKING

THERE WILL BE A REDUCED RATE OF $10/DAY FOR REGISTERED guests to park at the hotel. Valet parking is available for $30/day.

DRIVING DIRECTIONS TO HOTEL

THE ATLANTIC CITY EXPRESSWAY IS THE FASTEST ROUTE TO Atlantic City from I-95 and the Philadelphia area. The Expressway is a toll road and toll lanes offer EZ-Pass as well as manned cashier booths. The Expressway ends in the heart of Atlantic City and the Sheraton will be visible immediately to your left. Continue two blocks ahead and make a left onto Atlantic Avenue. After two more blocks turn left onto Michigan Avenue which will take you directly into the convention center and hotel complex.

WELCOME

The Sheraton Atlantic City Convention Center Hotel

THE CONVENTION COMMITTEE
LEFT TO RIGHT: Nick Myers, Nathan Bryson, CHAIR
Dennis Cook, Chuck Gibson, Scott Banks, Carl Hersom

ARRIVING BY TRAIN

THE ATLANTIC CITY RAIL LINE OFFERS CONVENIENT DAILY service from Philadelphia 30th Street Station to the Atlantic City Rail Terminal. From Philadelphia, the trip takes about 90 minutes. Visit www.njtransit.com to view schedules and purchase tickets. The Atlantic City Rail Terminal is located within the same complex as the hotel.

ARRIVING BY AIR AT ACY

ATLANTIC CITY INTERNATIONAL AIRPORT (ACY) IS THE CLOSEST airport; however, Spirit Airlines is the only carrier currently operating at the airport. The Atlantic City Jitney Association offers shuttle service to and from the airport. Transportation from AC International to Atlantic City doesn't require any reservations. You will need to make a reservation to return to the airport. Call (609) 576-2776 to book your service to AC International. All reservations should be booked at least 24 hours in advance.

ARRIVING BY AIR AT PHL

PHILADELPHIA INTERNATIONAL AIRPORT (PHL) IS LOCATED approximately one hour away. You can take Septa's R1 Airport Train Line from any terminal at Philadelphia International directly to 30th Street Station. It's about a 20-minute ride. The trains depart every 30 minutes from about 6 am to midnight. At 30th Street Station transfer to the Atlantic City Line.

NOTE: *Do not use the Newark airport since connections to Atlantic City are difficult.*

SCHEDULE

SATURDAY, OCTOBER 8
PRE-CONVENTION TOUR

8:30 AM **Buses Depart for Philadelphia**

10:00 AM **Wanamaker Organ Tour**
Macy's Philadelphia

11:00 AM **Demo: Greek Hall, Macy's Philadelphia**
Wurlitzer Op. 2070, 1929

12:00 Noon **Wanamaker Organ Concert**
L.A. Art Organ Co. 1904

1:00 PM **Lunch on one's own in Center City, Phil.**

2:00 PM **Buses Depart for the Haas Residence**

2:30 PM **Tour and Demonstration:**
Aeolian-Skinner, No. 617, 1926;
Flight & Robson ca. 1820

4:00 PM **Buses Depart for Atlantic City**

5:30 PM **Arrive at Hotel**

SATURDAY, OCTOBER 8

8:00 AM **Registration Desk Open**

8:00 AM **Exam Review Session I**

12:00 Noon **Lunch on one's own**

1:00 PM **Exam Review Session II and Examination**

5:00 PM **Free Time**

6:00 PM **Sunset Cruise on the back bay of Atlantic City (additional charge)**

Includes catered food plus a CASH ONLY bar (NO credit cards). Cruise leaves dock promptly at 6:30 PM and returns at 8:30 PM

SUNDAY, OCTOBER 9

8:00 AM **Exhibitor Setup**

9:00 AM **Board of Director's Meeting I**

TBD **Convention Overview Committee Planning Meeting**

12:00 Noon **Lunch on one's own**

1:30 PM **Lecture: New Organ Console Technology from the organist's perspective**

Nathan Laube

2:30 PM **Lecture: History of Senator Emerson L. Richards**

Jonathan Ambrosino

We think of Emerson Richards as the brainchild behind the world's largest pipe organ. But this wealthy, headstrong, and confident devoté of the pipe organ was no mere enthusiast. He had an immense influence on the builders of his time, the post-orchestral "American Classic" organ movement of 1925–1950. Through his early writings on the life of Bach and baldly polemical organ write-ups of the 1930s (propaganda thinly disguised as reviews), Richards molded the thought of a generation more than any other person who was neither player nor builder. A string of organs in his Atlantic City home, increasingly larger and edgier, gave him a personal laboratory for experimentation unlike anyone else.

3:30 PM **Break**

4:00 PM **Lecture: Fisk Opus 150 at Christ Church, Philadelphia**

David Pike, C.B. Fisk

Low pressure voicing and the process of discovery

5:00 PM **Free Time**

6:00 PM **Dinner and Exhibitor's Night**

6:00 PM **35 and Under Dinner**

11:00 PM **Exhibits Close**

MONDAY, OCTOBER 10

7:30 AM **Registration Desk Open**

8:00 AM **Buses Depart for Philadelphia**

9:30 AM **Demonstration: Christ Church, Philadelphia**

C.B. Fisk Organ, Opus 150, 2018

11:00 AM **Buses Depart for Bryn Athyn Cathedral**

12:00 Noon **Lunch at Bryn Athyn Cathedral**

1:00 PM **Demonstration: Bryn Athyn Cathedral**

Kegg Pipe Organ Builders, 2014.
Incorporating two Skinner organs:
No. 574, 1926 and No. 682, 1928

2:00 PM **Buses Depart for Saint Mark's Episcopal, Philadelphia**

3:00 PM **Demonstration: Saint Mark's Episcopal**

Aeolian-Skinner Organ, No. 948, 1936

4:00 PM **Buses Depart for Hotel**

6:00 PM **Dinner at Hotel and Exhibits Open**

10:00 PM **Exhibits Close**

SCHEDULE

TUESDAY, OCTOBER 11

7:30 AM **Registration Desk Open**

8:00 AM **Annual Membership Meeting with Continental Breakfast**

9:00 AM **Break with Exhibits**

9:30 AM **Panel: Trash or Treasure**
OSI, Oyster, Killinger, Stinkens
A deeper dive into the restoration versus replacement of existing tonal resources

10:30 AM **Coffee Break**

10:45 AM **Lecture: Stay Out of Trouble – The Language of Proposals and Contracts**
Sebastian Glück

12:00 Noon **Lunch with Exhibits**

12:00 Noon **Board of Directors Meeting II**

1:30 PM **Lecture: AIO Certification: Take Another Look!**
Fredrick Bahr
Fred will discuss ways that the AIO exams can be critically important in advancing your career as an organbuilder. The syllabus and other materials that have been compiled by the Exam Committee provide a structure from which a great deal of knowledge can be gained. Preparing for the exam is more important than the exam itself, and we will look at ways to encourage that. Achieving AIO Certification involves much more than merely attending the review sessions. Let us help you make that commitment!

2:30 PM **Walk to Boardwalk Hall**

3:00 PM **Tonal Demonstration – Ballroom**
Kimball Organ, Opus 7073, 1930

3:30 PM **Chamber Tour – Ballroom Kimball**

4:30 PM **Break and Dinner on one's own**

7:00 PM **Recital: Ballroom – Kimball Organ**
Nathan Avakian

7:50 PM **Artist's Reception – Boardwalk Hall Concourse**

8:30 PM **Recital: Auditorium – Midmer-Losh Organ**
Garrett Martin

WEDNESDAY, OCTOBER 12

8:00 AM **Registration Desk Open**

8:00 AM **Final Exhibit Time with Breakfast**

9:30 AM **Lecture: History of the Midmer-Losh Company**
Nathan Bryson
We take an in-depth look at this lesser-known yet influential company examining their effects on the organ building industry and how they came to be the builder of the largest pipe organ in the world.

10:30 AM **Lecture: The Pipe Organs of Boardwalk Hall**
Nathan Bryson
Hidden in the walls of Boardwalk Hall are two pipe organs totaling more than 500 ranks. We will examine their construction, history, restoration and use in a modern multi-purpose facility.

11:30 AM **Walk to Boardwalk Hall**

12:00 Noon **Welcome and Lunch**

1:00 PM **Chamber Tours**

3:00 PM **Break**

3:15 PM **Tonal Demonstration – Midmer-Losh Organ, ca. 1933**
Chuck Gibson and Scott Breiner

4:15 PM **Lecture: WTFraction?! The Science Behind Mutations in Pipe Organs**
Carl Hersom and Nick Myers
An in-depth look and aural sampling of the expansive mutations available on the Midmer-Losh while also including demonstrations of the harmonic series by Carl Hersom on the orchestral French horn.

5:15 PM **Photo Opportunity and Group Photo**

5:40 PM **Walk to Hotel**

6:30 PM **Cash Bar**

7:30 PM **Banquet and Awards**

THURSDAY, OCTOBER 13
POST-CONVENTION TOUR

8:00 AM **Registration Desk Open**

8:30 AM **Buses Depart for Battleship New Jersey**

10:00 AM **Guided Fire Power Tour of Battleship New Jersey**

11:30 AM **BBQ Lunch on deck of Battleship New Jersey**

12:30 PM **Buses Depart for Saint Clement's Episcopal. Philadelphia**

1:00 PM **Demonstration and Tour: Saint Clement's Episcopal, Philadelphia**
Moller Organ Opus 6136, 1933, Relocated, Curt Mangel & Assoc.; 2017 Austin Organ No. 507, 1914/1948/1997. New Console by R.A. Colby

2:00 PM **Buses Depart for Stoneleigh**

2:30 PM **Demonstration and OHS Archives Tour: Stoneleigh, Villanova**
Aeolian-Skinner Organ, No. 878. Restored & relocated, Emery Bros., 2016

4:00 PM **Buses Depart for Hotel**

5:30 PM **Dinner on one's own**

PRESENTERS

JONATHAN AMBROSINO

JONATHAN AMBROSINO IS A BOSton-area tuner-technician, who together with Joe Sloane looks after a select group of Boston-area instruments (Trinity Church, Old South Church, Church of the Advent), many of which he has shepherded through some form of tonal restoration or reconstruction. As an advisor, Ambrosino has consulted to churches nationally and abroad on projects for new and restored pipe organ projects, including Saint Thomas New York and Harvard University. Current consultation includes the three new organs for Trinity Church (Wall Street), the restoration of Möller Op. 8000 at Central Presbyterian Church, and survey work at Church of the Heavenly Rest, to mention only those in New York City. Over the past 30 years, he has lectured at numerous AIO Conventions, and served twice as editor of the AIO Journal.

NATHAN AVAKIAN

NATHAN AVAKIAN IS A SONGWRITER, film composer, and organist based in New York City. His fascination with the pipe organ began at age four with a visit to Portland's Organ Grinder restaurant, and he later studied organ with Donna Parker and Jonas Nordwall. Since winning the ATOS Young Theatre Organist Competition in 2009, Nathan has performed across the United States, Australia, New Zealand, Canada, and Thailand. He has several albums to his credit featuring various pipe organs and virtual orchestrations.

As director of music and resident composer for the International Youth Silent Film Festival, Nathan creates music that inspires young filmmakers around the world. He also scores historic silent films for Thanhouser Company Film Preservation and contemporary films by various filmmakers. Known for his unique blending of virtual instrument technology with organ music, Nathan's live performances aim to satisfy contemporary musical tastes and pay tribute to the historical legacy of the pipe organ.

FREDRICK BAHR

FREDRICK BAHR IS TONAL DIRECTOR at Buzard Pipe Organ Builders, in Champaign, Illinois. He began his organbuilding career in 1978 at Berghaus Organ Company developing skills in a variety of areas from service work to case construction, mechanical and electric actions, flue voicing, and tonal finishing. Over the years he has come to concentrate his efforts in tonal areas and has had the privilege of working with a number of different builders both as an employee and as a freelance finisher.

Fred is Organist of Emmanuel Episcopal Church in Champaign, and is an active member of the AGO and OHS. He has been a member of AIO since 1979, serving in several positions including President, and is deeply committed to the goals of this organization. With his personal motto of "Building bridges and opening doors" he is passionate about encouraging the next generation of organbuilders. His presentation at this convention focuses on the role of the certification exams in that development process.

NATHAN L. BRYSON

SINCE 2015, NATHAN L. BRYSON IS CUrator of Pipe Organs at Boardwalk Hall. A native of Brevard, North Carolina, prior to moving to New Jersey, Nathan was Project Manager with Cornel Zimmer Organ Builders and Organist-Choirmaster at Robinson Presbyterian Church in Charlotte. He has been involved with multiple Wanamaker Organ Symposiums focusing on the restoration and relocation of the Orchestral division and assisted with the Wurlitzer installation in the Greek Hall.

At age eight, Nathan began studying piano. He continued his studies with Jane Dill at Southern Wesleyan University, graduating in 2004 with a B.S. in Internet Computing and B.A. in Music. While there he was active in Concert Choir, Chamber Singers, Wind Ensemble, and Jazz Band, and studied the carillon.

Nathan is a member of the AGO and AIO. When not working on pipe organs, Nathan has an avid interest in nuclear and disaster tourism and has visited Chernobyl. In his off time, he enjoys historic cars and playing with Zoryana, his Chernobyl rescue dog.

BRIAN DAVIS

BRIAN CAME TO THE INDUSTRY HAVing earned a Bachelor of Arts in Music at the University of Texas in Austin with a minor study in Chemistry. He has been voicing organs in the U.S. for 37 years. As such he has been exposed to a myriad of voicing styles and pipework construction ranging from cone tuned Neo-Baroque organs to the heavy-metal romantic voices that are prevalent again today. Reusing old pipework and integrating it into a new instrument has become one of his specialties over the years.

CHARLES GIBSON

CHARLES "CHUCK" GIBSON BECAME enamored with the pipe organ while listening to the famous Girard College Skinner as a student.

Upon graduation in 1973, Chuck began full-time work as an apprentice at Burger and Shafer Organ Co. of Findlay, Ohio. Chuck then accepted a position with the Mangam Organ Co. of Philadelphia, and became Assistant Curator of the Wanamaker organ. Often solicited by local churches for his expertise, he began service work on the side, forming C.W. Gibson, Inc., Pipe Organ Specialties in 1987, and acquiring the Mangam company in 1996.

C.W. Gibson, Inc. began restoration work on the blower and wind systems on Boardwalk Hall's Kimball in 2008. When completed, Chuck was asked to assist with the Midmer-Losh organ, and was named Professional Assistant to the Curator in 2015. He is now Treasurer for the Historic Organ Restoration Committee.

SEBASTIAN M. GLÜCK

SEBASTIAN M. GLÜCK IS ARTISTIC and Tonal Director of Glück Pipe Organs, located in New York City. While working as a corporate and residential preservation architect, he earned his A.B. in Architecture and M.S. in Historic Preservation from Columbia University, and the Colleague's Certificate from the AIO. He has served the Organ Historical Society as their National Councilor for Research and Publications, as well as on their Guidelines for Restoration and Conservation Committee and the Historic Organ Award program. A conservatory-trained organist, he served for many years as Secretary of the Executive Board of the New York City Chapter of the AGO, and was appointed Chair of the AGO Region II Convention in 2007. A past editor of *The Journal of American Organbuilding*, Sebastian is a frequent lecturer and is an internationally published author of articles about organ building, restoration, history, musicology, technology, and tonal structure. He has served as an organ consultant and expert witness, both practically and forensically, for property-owning institutions, insurance companies, and law firms, with experience in both the office and the courtroom.

CARL HERSOM

CARL HERSOM GRADUATED WITH A B.A. in Music from the Schwob School of Music of Columbus State University in Columbus, Georgia, where he studied horn with Jason Eklund and Anna Dodd and studied organ with Joseph Golden. As a youth, he learned about carpentry, electricity, and mechanical movement from his father. This, paired with studying the organ in college led to a semester-long independent study of organbuilding and his serious dedication to organ restoration. After graduation, he apprenticed with, and was employed by Gary H. Phillips of Attleboro, Massachusetts, where he learned fine wood-working and leathering skills. Prior to his full-time appointment with the Historic Organ Restoration Committee, he was employed part-time with both HORC and the Friends of the Wanamaker Organ.

Carl is a member of the Philadelphia Handbell Ensemble and the South Jersey Area Wind Ensemble. He lives in Mays Landing, New Jersey with his husband, Nick, Milo the kitty, and Brenda the pug.

GARRETT F. MARTIN

GARRETT F. MARTIN HOLDS AN M.M. Degree from the University of Texas, Austin, in Sacred Music and Organ Performance, a Performer's Certificate in Organ and Accompanying from Vanderbilt University, as well as a Church Music and Organ Performance Degree from Carson-Newman University. His major teachers include Gerre and Judith Hancock, Peter Fyfe, Carl Smith, and J. Ryan Garber.

PRESENTERS

The American Organist wrote "...impressively played...masterfully improvised..." Since 2013, Martin has served as the Organist and Director of Music at Westminster Presbyterian Church, Buffalo, New York, where he directs and oversees the church's five choirs and The Westminster Choir School, attends to the maintenance of the two historic Aeolian-Skinner organs, and coordinates a concert series. For five years, he served as the Artistic Director of the Buffalo Gay Men's Chorus and since 2016, as an artist for the Rodgers Organ Company of Hillsboro, Oregon.

A native of Tennessee, Martin has previously served churches in Tennessee, Texas, and Coral Ridge Presbyterian in Florida.

NICK MYERS

NICK MYERS HAS A MASTER'S DEGREE in Musical Theatre Composition from the New York University Tisch School of the Arts. After seven years living in New York City, working on the Broadway productions of *Bring it On, If/Then,* and *Grace*, plus various off-Broadway productions, he took a break from musical theatre and moved to Philadelphia to pursue his passion of pipe organ work.

Nick was employed with the Friends of the Wanamaker Organ from 2017 to 2022, assisting in the restoration of the String, Solo, and various Pedal divisions. Notable outside ventures include helping with the installation of the new combination action on the Midmer-Losh console, restoration of the 1939 Aeolian-Skinner at St. Mary of the Immaculate Conception in Jersey City, and the Wonder Morton in the United Palace Theatre in Manhattan.

Nick composes music for choir and theatre, and is the Music Director and Organist at the Parish of St. Monica in Atlantic City.

DAVID PIKE

DAVID C. PIKE, EXECUTIVE VICE PRESident and Tonal Director of C.B. Fisk, Inc., joined the company in 1976. An excellent cabinet maker, he practiced the full range of organ building during his early years with the company. David's musical background eventually led him to become an assistant voicer to Charles Fisk, and they first worked together on Opus 78 at House of Hope Presbyterian Church in St. Paul, Minn. Working with Charlie, David acquired the commitment to voicing that has been the hallmark of Fisk instruments for over 60 years.

In September 1994, David was named Tonal Director and Head of the Voicing Department.

Educated at the Eastman School of Music, he studied music theory and organ performance, earning a Bachelor of Music degree with highest distinction. Along with other members of the Fisk team, he has participated in numerous on-site research studies of Renaissance, Classical, and Romantic organs in Germany, France, Spain, and, most recently, Italy.

In addition to his work at C.B. Fisk, David is Director of Music at St. Mary's Episcopal Church, Rockport, Massachusetts.

BRYAN TIMM

BRYAN TIMM IS A NATIVE OF NORTHwestern Pennsylvania. He graduated from Mercyhurst University, D'Angelo School of Music, Erie, with a concentration in organ performance and a business administration minor. His organbuilding apprenticeship with the Fischer Organ Company of Erie was under the tutelage of Paul Fischer. Bryan serves as Vice-President of Organ Supply Industries, Inc, and received the AIO Fellow Certificate in 2011. He also serves as Organist/Choirmaster at Immanuel Lutheran Church and as touring accompanist for the Mercyhurst University Concert Choir.

ROB WEBER

ROB WEBER BEGAN HIS CAREER WITH Jacques Stinkens Orgelpijpenmakers B.V. in 1977. Located in Zeist, The Netherlands, the company has been in business since 1914. Rob serves as one of the two directors of this firm that supplies organ pipe work to builders in countries throughout the world. Having learned the basics of the trade, he gradually moved into sales and then took a management position beginning in 1991.

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felt hammers

bronze mallets

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References | organ builders: Austria: Orgelbau Pieringer, Orgelbau Rieger **Canada:** Organbuilder Pole & Kingham **Germany:** Orgelbau Albiez, Orgelbau Klais, Hermann Eule Orgelbau, Orgelbau Hubert Fasen, Kaps Orgelbau, Orgelbau Hugo Mayer, Orgelbau Hoffmann & Schindler, Werkstätte für Orgelbau Mühleisen, Orgelbau Reichel, Orgelbau Richard Rensch, Vleugels - die Orgelmanufaktur, Orgelbau Waltershausen, Georg Weishaupt Orgelbauwerkstätte **Italy:** Brondino Vegezzi-Bossi **Slovenia:** Orglarstvo Škrabl **Switzerland:** Orgelbau Goll, Orgelbau Kuhn

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Integrated Organ Technologies, Inc. proudly announces the completion of the installation of its Virtuoso control system for The Church of Jesus Christ of Latter-day Saints in the organs in both the Tabernacle and the Conference Center at Temple Square in Salt Lake City, Utah. These instruments are used for daily concerts and weekly live broadcasts that reach millions of listeners around the globe. The Virtuoso system handles all aspects of the organs' combination action, couplers, and switching in one compact, integrated package.

The 5-manual, 206-rank Aeolian-Skinner organ in the Salt Lake Tabernacle is one of the most recognized organs in the world as the centerpiece of the weekly live broadcast, *Music and The Spoken Word*, which has broadcast weekly since 1929. The original organ was installed in 1867 and has been expanded and rebuilt several times over the past 150 years by craftsmen from Kimball, Austin, Aeolian-Skinner, Schoenstein, and others.

The 5-manual, 131-rank Schoenstein organ in the Conference Center is a much newer instrument, having been completed in 2003. The Conference Center is a massive space with seating for 21,000 people. Such a large space presented significant challenges for Schoenstein and required many creative features in the organ and its control system. The lOTI team, including Dwight Jones, Sean O'Donnell, and Christopher Soer, worked on-site with Louis Patterson and Chris Hansford of Schoenstein and Temple Square Organ Curator Robert Poll to install the new Virtuoso control system.

The Virtuoso control system was installed in the Tabernacle organ by Temple Square Organ Curator Robert Poll and Temple Square staff. "The Tabernacle organ is really a world heritage instrument," said Poll. "We have a special responsibility to those who came before us to continue to maintain and enhance this marvelous instrument."

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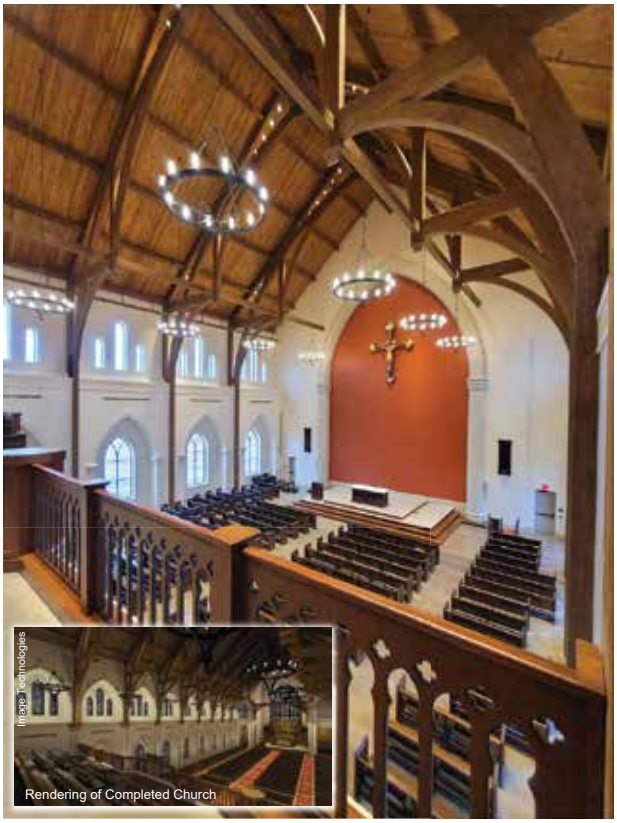
St. Philip's is home to 3200 families, located in one of the fastest-growing areas of the country. But things didn't start out that way. . . the fledgling congregation held its first mass in November 1967 and built their first church in 1971. Rapidly outgrowing that building, a new church and parish hall were completed in 1977. By 1986 the burgeoning parish counted over 1400 families, and the second church had become too small. A third church in an arena-style was completed in 1997. Within two decades the parish outgrew *that* church, and with no space to expand, relocation was necessary to continue building the St. Philip's community.

In 2014, planning began for a new parish campus. A wooded hilltop site in nearby Flower Mound was purchased, followed by several years of fundraising, planning, design and construction. Phase I of the new parish campus, including the 800-seat rear half of the church plus support spaces was completed in 2022. Future plans include a 1000-seat Phase II parish hall plus completion of the church to add up to 1000 more seats.

We joined the project part-way through design and were delighted to find a pastor who embraced time-honored building forms and championed traditional Catholic liturgical music led by choir and organ. A generous natural acoustic to support the liturgy and congregational singing was an essential component. The architects brought a solid understanding of historic church design as viewed through a 21st-Century aesthetic lens, and employed practical, affordable, modern construction techniques to realize an excellent compromise of the many competing architectural, engineering, liturgical, acoustical, musical and spoken word requirements.

The scale of this *parish* church is vast, even at half its final length: 95' long x 75' wide x 78' high. Walls are built up from multiple layers of cement board and dense drywall. The organ chamber has four total layers on heavy-gauge steel framing isolated from adjacent offices. 3"-thick laminated tongue & groove southern pine is used for the exposed roof deck. The floor is polished concrete, and the walnut pews have no pads. Full-bandwidth reverberance exceeds 5 seconds (unoccupied). Phase I of a new Casavant organ will be installed in late 2022. We also designed a speech-reinforcement sound system for intelligibility of the spoken word from the sanctuary, plus balcony voice-amplification for cantors. Now, St. Philip's can really grow!



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DEMOCRATIC CONVENTION 1964

The 1964 Democratic National Convention, the only presidential convention held in Atlantic City to date. The top of the console and topmost keyboards are barely visible at the bottom of the right striped banner and to the rear of the stage apron. Note large main chambers left and right of stage, at balcony level in bays one and four, and the Fanfare grill midway up bay four.

ATLANTIC CITY

JIM WHELAN BOARDWALK HALL

PHOTO: Carl Hersom

JIM WHELAN BOARDWALK HALL

Atlantic City, New Jersey

MIDMER-LOSH INC.

Merrick, Long Island, New York, 1929–1932

THE STOPLIST BELOW IS NOT AN EXACT DOCUMENTATION OF THE console stop key nomenclature, but rather an interpretation of the information contained thereon. Viewed from the console, some divisions may be disposed across several rows, rank numbers indicate a voice's source, colored jewels indicate the 50″ and 100″ stops, and capitalized abbreviations make an organist's quick glancing at the array of stop keys easier to interpret, given the vast amount of information a player must instantly compute while playing. The multiplicity of harmonic stops, both derived and independent, were major components of Senator Richards' theoretical chorus constructions and are so identified by large-font harmonic-series numbers on the stopkeys, and this format is reproduced below. Otherwise, while many versions of the printed stoplists state the registers in console order, what may be clear at the console is confusing on paper. Therefore, stops listed below may be out of console order so as to be more logically interpreted in standard stoplist format. By any measure, the organ is vast, and the extensive unification on the seven-manual console contributes to its overwhelming immensity. Beyond the two main chambers, certain divisions, dispersed spatially about the hall for optimum sound dispersal, were considered independent organs with corresponding pedal divisions. The compound divisions, ex. *Great-Solo* and *Solo-Great,* designate a department playable independently from two manuals. The five-manual portable console was intended by Richards to be the distillation of the instrument to its bare, un-unified core, and while more immediately accessible for digestion, even that is overwhelming at first glance. Interpretation of the source numbers to give a more clear interpretation of its musical resources would yield a stoplist the size of a small book. With space in this format at a premium, the dedicated student will please endure the necessary inconvenience of flipping back and forth between the stoplist and chamber analysis, and the interested researcher is referred to Stephen Smith's extensive biography of the instrument for an exhaustive history, analysis, and technical detail. In the stoplist below, the red and green stops indicate the similarly bejeweled 100″ and 50″ registers respectively. Care has been taken to present the stops largely as spelled on the console, including misspellings, ex. *Saxaphone, Castinets*. Editorial clarifications are in [brackets].

Pitch	Stop Name		Voice Number
Pedal Right [stage chamber]			
64	Diaphone		17
32	Sub Principal		21
32	Contra Tibia		1
21⅓	Quint Tibia		1
16	Diaphone Phonon		2
16	Diapason		22
16	Principal		4
16	Diapason		21
16	Geigen Principal		82
16	Tibia Major		3
16	Grand Bourdon	[Clausa]	1
16	Flute Major		59
16	Wald Flute		81
16	Tibia Clausa		83
16	Viol		5
12⅘	Gross Tierce		6
10⅔	Quint Diaphone		2
10⅔	Quint Tibia	[Clausa]	1
10⅔	Quint Tibia	[Major]	3
10⅔	Quint Principal		4
10⅔	Quint Minor		83
9⅔ [*sic*]	Septieme	[9⅐]	7
8	Octave Principal		4
8	Octave Major		22
8	Octave Diapason		85
8	Octave Geigen		82
8	Gross Gemshorn		87
8	Tibia Major		3
8	Tibia Clausa		1
8	Doppel Gedeckt		86
8	Octave Viol		5
6⅖	Gross Tierce		6
5⅓	Quint Tibia	[Clausa]	1
5⅓	Quint Principal		4
5⅓	Quint Tibia	[Major]	3
4⅘	Gross Septieme		7
4	Super Octave		4
4	Super Octave		85
4	15th Tibia		3
4	15th Flute	[Clausa]	1
4	15th Viol		5
3⅕	17th Tierce		6
2⅔	19th Flute	[Clausa]	1
2⅔	19th Tibia Major		3
2⅔	19th Viol		5
2⅐	21st Septieme		7
2	22nd Tibia		4
2	22nd Flageolet		81
1⅗	24th Octave Tierce		6
1⅓	26th Tibia	[Major]	3
1⅐	28th Octave Septieme		7
1	29th Flute	[Clausa]	1
11 Rk.	Mixture [Solo-Great mutations]		
5 Rk.	Reed Mixture [Solo-Great 95, 97, 100]		
64	Dulzian		17
42⅔	Contra Dulzquint		17
32	Contra Bombardon		8
32	Contra Dulzian		17
21⅓	Quint Dulzian		17
16	Grand Ophicleide		9
16	Tuba Magna		73
16	Bombardon		8
16	Trumpet Profunda		74
16	Dulzian		17
16	Trumpet		10
16	Saxaphone		96
16	Krummhorn		100
16	Oboe Horn		95
16	English Horn		97
16	French Horn		98
16	Vox Baryton		99
10⅔	Quint Bombard		8
10⅔	Quint Dulzian		17
8	Ophicleide		9
8	Octave Bombardon		8
8	Octave Dulzian		17
8	Bugle		78
8	Trumpet		10

JIM WHELAN BOARDWALK HALL

8	Octave Krummhorn		100
8	Vox Baryton		99
5⅓	Quint Trumpet		10
5⅓	Quint Bombardon		8
4	15th Dulzian		17
4	15th Trumpet		10

Pedal Left [stage chamber]

32	Diaphone		11
32	Diapason		12
16	Diaphone		11
16	Major Diapason		320
16	Diaphone		13
16	Diapason		12
16	Diapason		117
16	Tibia Clausa		15
16	Doppel Gedeckt		147
16	Stopped Diapason		311
16	Bass Viol		14
16	Bass Viol		254
16	Bass Gamba		131
16	Cone Gamba		148
10⅔	Quint Diapason		12
10⅔	Stopped Quint		311
10⅔	Cone Quint		148
8	Octave Gemshorn		152
8	Octave Diaphone		11
8	Octave Diapason		13
8	Octave Phonon		12
8	Gross Flute	[Clausa]	15
8	Flute Clarabella		149
8	Cello		14
6⅖	10th Terz		155
5⅓	12th Twelfth		156
4⅘	14th Octave Septieme		157
4	15th Fife	[Diaph.]	11
4	15th Super Octave		12
4	15th Gemshorn		152
4	15th Flute	[Clausa]	15
3⅕	17th Tierce		155
2⅔	19th	[Sw-Ch]	156
2⅖	21st	[Sw-Ch]	157
2	22nd Gemshorn		152
2	22nd	[Diapason]	12
2	22nd Fife		15
1	29th	[Tibia]	15
32	Contra Bombard		18
32	Fagotto		19
16	Major Posaune		20
16	Bombard		18
16	Trumpet		138
16	Horn		142
16	Bass Clarinet		161
16	Fagotto		19
16	Oboe		160
16	Vox Humana		162
8	Major Posaune		20
8	Octave Bombard		18
8	Octave Clarinet		161
8	Octave Fagotto		19
8	Octave Oboe		160
5⅓	12th Horn		19
4	15th Bombard		18
4	15th Oboe		160
4	15th Horn		19
2⅔	19th Horn		19
2	22nd Fagotto		19
7 Rk.	Stentor Sesquialtera		16
6 Rk.	Grave Mixture	[#142, 160]	
	Brass Chorus	[floating]	
	Pedal Divide		
	at c13 for all Man.-Ped. couplers		
8	Choir		
4	Choir		
8	Great		
4	Great		
8	Swell		
4	Swell		
8	Solo		
4	Solo		
8	Fanfare		
4	Fanfare		
8	Echo		
	String I		
	String II		
	String III		
	Gallery I Reeds		
	Gallery II Flutes		
	Gallery III Diapasons		
	Gallery IV Orchestral		

Pedal Right Gallery

32	Contra Violone		298
16	Diaphone		233
16	Flute Maggiore		242
16	Flute Bourdon		220
16	Spire Flute		214
16	Contra Bass		266
16	Contra Viol		298
16	Double Bass		265
16	Contra Viol		267
16	Contra Gamba		213
10⅔	Quint Flute		220
8	Cone Flute		214
8	Viol		298
4	Viol		298
16	Trumpet Sonora		235
16	Tuba D'Amour		231
16	Chalumeau		227
16	Contra Bassoon		226
16	Vox Baryton		230
8	Bassoon		226

Pedal Left Gallery

16	Grand Diapason		236
16	Dulciana		171
16	Major Flauto		197
16	Double Melodia		176
8	Melodia Flute		176
32	Contra Trombone		299
16	Posaune		205
16	Bombardon		206
16	Trombone		299
16	Trombone		188
16	Saxaphone		249
10⅔	Tromba Quint		209
8	Trombone		299
8	Tromba		188
6⅖	Tromba Tierce		210
5⅓	Tromba Quint		209
3⅕	17th Tromba		210

Pedal Percussion

	Persian Cymbal	K
	Persian Cymbal	J
	Chinese Gong Roll	I
	Chinese Gong Strike	I
	Cymbal	H
	Snare Drum Roll	F & G
	Snare Drum Roll	E
	Bass Drum Roll	D
	Bass Drum Strike	D
	Bass Drum Roll	C
	Bass Drum Strike	C
	Bass Drum Roll	C
	Bass Drum Strike	C
FF	Contra Drum Roll	B
FF	Contra Drum Strike	B
MP	Contra Drum Roll	B
	Bass Drum Strike	B
16	Piano	A
8	Piano	A
	Chimes	108

Pedal Second Touch

64	Diaphone	17
32	Diaphone	11
16	Diaphone	13
16	Tibia Major	3
16	Contra Viol	5
8	Tibia Major	3
8	Viol	5

4	Tibia	3
4	Viola	5
64	Dulzian	17
32	Contra Bombard	18
32	Contra Bombardon	8
16	Ophicleide	9
16	Posaune	20
16	Bombard	18
16	Bombardon	8
8	Octave Ophicleide	9
8	Posaune	20
8	Bombardon	8
8	Dulzian	17
4	Bombard	18
4	Dulzian	17
	Chimes	108
	Cymbal	H
	Persian Cymbal	J & K
	Snare Drum Roll	F & G
	Snare Drum Roll	E
	Snare Drum Strike	E
FF	Bass Drum Strike	D
FF	Bass Drum Roll	C
FF	Contra Drum Roll	B
FF	Contra Drum Strike	B
	Brass Chorus	
	Fanfare	
	String I	
	String II	
	Gallery I Reeds	
	Gallery III Diapasons	

Great – Manual 2

32	Sub Principal	21
16	Double Diapason I	22
16	Double Diapason II	23
16	Double Diapason III	24
10⅔	Sub Quint	25
8	Principal	21
8	Diapason I	26
8	Diapason II	27
8	Diapason III	28
8	Diapason IV	29
8	Diapason V	30
8	Diapason VI	31
8	Diapason VII	32
8	Diapason VIII	33
8	Diapason IX	34
8	Diapason X	35
8	Harmonic Flute	53
8	Flute Overte	54
5⅓	Quint	36
4	Octave I	37
4	Octave II	38
4	Octave III	39
4	Octave	22
4	Octave IV	40
4	Octave V	41
4	Harmonic Flute	55
3⅕	Gross Tierce	42
2⅔	12th Major	43
2	15th Fifteenth I	44
2	15th Fifteenth II	45
2	15th Fifteenth III	46
2	Super Principal	21
2 Rk.	Rausch Quint [5⅓]	47
2 Rk.	Rausch Quint [2⅔]	48
11 Rk.	Grand Cornet	49
5 Rk.	Sesquialtera Major	50
5 Rk.	Schulze Mixture	51
6 Rk.	Furniture	52
3 Rk.	Scharf Mixture [Cornet]	49
2 Rk.	Doublette Mixture [Schulze]	51
16	Trumpet	56
8	Harmonic Trumpet	57
4	Harmonic Clarion	58
	Brass Chorus [floating]	
	Chimes	108
8	Harp	107
4	Harp	107
4	Xylophone	95
2	Xylophone	95
	Snare Drum Roll	E
	Snare Drum Tap	E
	Snare Drums Roll	F & G
	Snare Drums Tap	F & G
	Triangle	N
	Tambourine	L
	Castinets	M
	Wood Block Stroke	O
	Wood Block Roll	O
	Tom Tom	P
	Chimes S. T. [*2nd touch*]	108
	Drums Muffled S. T. [*2nd touch*]	E&F&G
16	Choir	
8	Choir	
4	Choir	
16	Swell	
8	Swell	
4	Swell	
8	Solo	
4	Solo	
8	Fanfare	
4	Fanfare	
16	Echo	
8	Echo	
4	Echo	
	String I	
	String II	
	String III	
	Gallery I Reeds	
	Gallery II Flutes	
	Gallery III Diapasons	
	Gallery IV Orchestral	

Brass Chorus – Floating [all independent ranks]

16	Trombone	109
8	Trombone	110
8	Tromba	111
5⅓	Tromba Quint	112
4	Trombone	113
2⅔	12th Tromba	114
2	15th Trombone	115
3 Rk.	Tierce Mixture	116

Great Second Touch – Manual 2

8	Viol Phonon	254
8	Violon Cello	265
8	Viol	266
8	Viol	267
8	Solo	
4	Solo	
8	Fanfare	
	String I	
	String II	
	Gallery I Reeds	
	Brass Chorus [floating]	

Great-Solo – Manual 2 [duplex department]

16	Wald Flute	81
16	Tibia Clausa	83
16	Contra Geigen	82
10⅔	Wald Quint	81
10⅔	Quint Tibia	83
8	Diapason Phonon	84
8	Horn Diapason	85
8	Geigen Principal	82
8	Gemshorn	87
8	Gemshorn Celeste	88
8	Wald Flute	81
8	Tibia Clausa	83
8	Doppel Gedeckt	86
8	Viola d' Gamba	89
8	Vox Celeste	90
6⅔	Terz Gemshorn	91
5⅓	Wald Quint	81
5⅓	5th Gemshorn [Celeste]	92
4⅘	7th Septieme	93
4	Octave Phonon	84
4	Octave	85
4	Principal	82

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4	Gemshorn		87
4	Gemshorn Celeste		88
4	Wald Flute		81
4	Stopped Flute		83
4	Doppel Flute		86
4	Viola		89
4	Viola Celeste		90
3⅕	10th Gemshorn	[Celeste]	88
3⅕	10th Tenth	[Terz]	91
2⅔	12th Flute	[Wald]	81
2⅔	12th Minor	[Tibia]	83
2⅔	12th Twelfth	[Quint]	92
2⅔	12th Flute		64
2⅐	14th Octave Septieme	[Sept]	93
2	15th Fifteenth	[Horn]	85
2	15th Geigen		82
2	15th Gemshorn		87
2	15th Piccolo	[Wald]	81
1⅗	17th Gemshorn	[Celeste]	88
1⅗	17th	[Terz]	91
1⅓	19th	[Quint]	92
1⅐	21st	[Sept.]	93
1	22nd	[Gems]	87
⅘	24th	[Terz]	91
⅔	26th	[Quint]	92
½	29th	[Gems]	87
¼	36th	[operates *Gong*]	87
16	Oboe Horn		95
16	Krummhorn		100
16	Saxaphone		96
16	English Horn		97
16	French Horn		98
16	Vox Baryton		99
8	Oboe		95
8	Clarinet		101
8	Krummhorn		100
8	Orchestral Saxaphone		102
8	Saxaphone		96
8	English Horn		97
8	Orchestral Horn		103
8	French Horn		98
8	Kinura		106
8	Vox Humana		105
8	Vox Humana	[Baryton]	99
4	Octave Horn		95
4	Krummhorn		100
4	Saxaphone		96
4	English Horn		97
4	French Horn		98
4	Vox Humana		105

Grand Great – Manual 2 [Pedal duplex, 7 octaves]

ON	Grand Great	
8	Principal	4
8	Tibia Clausa	1
8	Tibia Major	3
4	Tibia Melody [coupler]	3
8	Viol	5
4	Viol Melody [coupler]	5
4	Octave [Gr.]	21
2	15th Super Octave	4
32	Dulzian	17
16	Trombone	8
8	Trombone Melody [coupler]	8
8	Ophicleide	9
8	Trumpet	10
4	Clarion	10
4	Clarion Melody [coupler]	10

Swell – Manual 3

16	Double Diapason	117
16	Contra Gamba	131
8	Diapason [I]	118
8	Diapason [II]	119
8	Waldhorn	120
8	Tibia Plena	124
8	Hohl Flute	125
8	Gross Gedeckt	126
8	Harmonic Flute	127
8	Harmonic Flute Celeste	312
8	Gamba	135
8	Gamba Celeste	136
8	Violin	132
8	Viol Celeste I 2 rks.	133
8	Viol Celeste II 2 rks.	134
4	Ocarina	128
4	Octave	121
4	Octave	117
4	Traverse Flute	129
4	Silver Flute	313
4	Viol Salicet	131
4	Viol Gambette	137
2	15th Fifteenth	122
2	Orchestral Piccolo	130
7 rks.	Plein Jeu	146
8 rks.	Cymbal	317
5 rks.	Fourniture	123
16	Double Trumpet	138
16	Double Horn	142
8	Harmonic Trumpet	139
8	Field Trumpet	140
8	Posaune	143
8	Cornopean	144
8	Muted Trumpet	314
8	Flugel Horn	145
8	Krummhorn	315
8	Vox Humana	316
4	Trumpet Clarion	141
4	Trumpet Clarion	138
4	Octave Horn	142
8	Marimba Repeat	163
8	Marimba Stroke	163
4	Marimba Repeat	163
4	Marimba Stroke	163
4	Glockenspiel Single	164
4	Glockenspiel Repeat	164
2	Glockenspiel Single	164
16	Swell	
4	Swell	
16	Choir	
8	Choir	
4	Choir	
16	Solo	
8	Solo	
4	Solo	
8	Fanfare	
4	Fanfare	
16	Echo	
8	Echo	
4	Echo	
	Brass Chorus	
	Gallery I Reeds	
	Gallery II Flutes	
	Gallery III Diapasons	
	Gallery IV Orchestral	
	String I	
	String II	
	String III	

Swell-Choir – Manual 3 [duplex department]

16	Gross Gedeckt	147
16	Stopped Diapason	311
16	Cone Gamba	148
8	Gemshorn	152
8	Gemshorn Celeste [I, sharp]	153
8	Gemshorn Celeste [II, flat]	154
8	Dopple Gedeckt	147
8	Dopple Spitz Flute	150
8	Clarabella	149
8	Stopped Diapason	311
8	Muted Gamba	148
6⅔	3rd Terz	155
5⅓	5th Major	156
5⅓	Quint Gamba	148
5⅓	Quint Gemshorn [Celeste I]	153
4⅘	7th Septieme	157
4	Octave Gemshorn	152
4	Spitz Flute	150
4	Claribel Flute	149
4	Dopple Flute	147
4	Stopped Flute	311
4	Zauber Flute	151

4	Cone Flute		148
3⅗	9th Ninth		158
3⅕	10th Major		155
3⅕	10th Gemshorn	[Celeste II]	154
2 10/11	11th		158
2⅔	12th Gemshorn	[Celeste I]	153
2⅔	12th Twelfth		156
2⅔	12th Flute	[Clara]	149
2⅔	12th Stopped Flute		311
2⅐	14th Octave Septieme		157
2	15th Gemshorn		152
2	15th Gedeckt		147
2	Magic Flute		151
1⅞	16th Sixteenth		158
1⅗	17th Major		155
1⅗	17th Gemshorn	[Celeste II]	154
1 5/11	18th		159
1⅓	19th Major		156
1⅓	19th Gemshorn	[Celeste I]	153
1⅐	21st		157
1	22nd	[Gemshorn]	152
1	22nd Zauber		151
⅘	23rd		158
⅘	24th		155
⅘ 11	25th		159
⅔	26th		156
½	29th	[Gemshorn]	152
⅓	33rd		156
¼	36th	[Gemshorn]	152
32	Fagotto		19
16	Contra Oboe		160
16	Bass Clarinet		161
16	Bass Vox Humana		162
8	Oboe		160
8	Clarinet		161
8	Vox Humana		162
4	Octave Oboe		160
4	Octave Clarinet		161
4	Vox Humana		162

Unenclosed Choir – Manual 1

16	Quintaton		165
8	Diapason		166
8	Holz Flute		167
4	Octave		168
2	15th Fifteenth		169
2 Rk.	Rausch Quint [2⅔, 2]		170
2 Rk.	Scharf Mixture [1⅓, 1]		170

Choir – Manual 1

16	Contra Melodia		176
16	Contra Dulciana		171
8	Diapason I		172
8	Diapason II		173
8	Gemshorn		184
8	Gemshorn Celeste		185
8	Dulciana		171
8	Dulciana Celeste		174
8	Philomela		177
8	Melodia Flute		176
8	Concert Flute		178
8	Unda Maris		179
8	Nachthorn		308
8	Viola Pomposa		186
8	Viola Celeste		187
8	Voix Celeste II	[2 rks.]	310
5⅓	Dulzquint		171
4	Fugara		309
4	Dolce		175
4	Spindle Flute		180
4	Flute Overte [*sic*]		181
2⅔	12th Melodia		176
2⅔	12th Dulzard		175
2	15th Flageolet		182
2	15th Melodia		176
2	15th Dulcett		175
1⅓	19th Dulce		175
1	22nd Dulcinett		175
6 Rk.	Acuta		196
3 Rk.	Flute Mixture		183
	Brass Chorus	[floating]	
16	Contra Tromba		188
8	Tromba Real		189
8	Brass Cornet		190
8	French Horn		191
8	Clarinet		192
8	Bassett Horn		193
8	Cor Anglais		194
8	Kinura		195
4	Tromba Clarion		188
16	Choir		
4	Choir		
8	Great		
8	Swell		
4	Swell		
8	Solo		
4	Solo		
8	Fanfare		
8	Echo		
	String I		
	String II		
	String III		
	Gallery I Reeds		
	Gallery II Flutes		
	Gallery III Diapasons		
	Gallery IV Orchestral		

Choir Second Touch – Manual 1

16	Double Bass		265
16	Contra Bass		266
16	Contra Viol		267
8	Viola		265
8	Viol Cello		267
8	Viol Cello		266
4	Viol Cello		266
4	Viol Cello		267
	String I		
	String II		
	Gallery I Reeds		
	Fanfare		

Choir-Swell – Manual 1 [duplex department]

16	Doppel Gedeckt		147
16	Stopped Diapason		311
16	Cone Gamba		148
8	Doppel Gedeckt		147
8	Stopped Flute		311
8	Clarabella		149
8	Spitz Flute		150
8	Gemshorn		152
8	Gemshorn Celeste I	[sharp]	153
8	Gemshorn Celeste II	[flat]	154
8	Muted Gamba		148
6⅔ [*sic*]	3rd Third [6⅖]		155
5⅓	5th Fifth		156
5⅓	5th Cone Gamba		148
5⅓	5th Gemshorn	[Celeste I]	153
4⅐	7th Seventh		157
4	Doppel Flute		147
4	Stopped Flute		311
4	Clarabella		149
4	Spitz Flute		150
4	Zauber Flute		151
4	Gemshorn		152
4	Cone Flute		148
3⅗	9th Ninth		158
3⅕	10th Tenth		155
3⅕	10th Gemshorn	[Celeste II]	154
2 10/11	11th Eleventh		159
2⅔	12th Flute	[Stp.]	311
2⅔	12th Flute	[Clara]	149
2⅔	12th Gemshorn	[Celeste I]	153
2⅔	12th Twelfth		156
2⅐	14th Fourteenth		157
2	15th Flute	[Spitz]	150
2	Magic Flute		151
2	15th Gemshorn		152
1⅞	16th Sixteenth		158
1⅗	17th Gemshorn	[Celeste II]	154
1⅗	17th Seventeenth		155
1 5/11	18th Eighteenth		159

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1⅓	19th Nineteenth		156
1⅓	19th Gemshorn	[Celeste I]	153
1⅐	21st Twenty-First		157
2	22nd Twenty-Second		151
2	22nd Gemshorn		152
⅘	23rd Twenty-Third		158
⅘	24th Twenty-Fourth		155
⅘₁₁	25th Twenty-Fifth		159
⅔	26th Twenty-Sixth		156
½	29th Gemshorn		152
¼	36th Gemshorn		152
32	Fagotto	[Ped.]	19
16	Contra Oboe		160
16	Clarinet		161
16	Vox Humana		162
8	Oboe		160
8	Clarinet		161
8	Vox Humana		162
4	Octave Oboe		160
4	Clarinet		161
4	Vox Humana		162
	Chimes	[Gr.-So.]	108
8	Marimba Harp Repeat		163
8	Marimba harp Stroke		163
4	Glockenspiel Repeat		164
4	Glockenspiel Single		164
2	Glockenspiel Single		164
	Snare Drum Roll		E
	Snare Drum Tap		E
	Snare Drums Roll		F & G
	Snare Drums Tap		F & G
	Wood Block		O
	Castinets		M
	Triangle		N
	Tom Tom		P

Grand Choir – Manual 1

[Pedal duplex, 7 octaves]

ON	Grand Choir		
16	Diaphone		11
16	Diaphone Melody	[coupler]	11
8	Diaphone		11
8	Diapason		12
8	Diaphonic Diapason		13
8	Tibia Clausa		15
8	Viol Cello		14
16	Bombard		18
16	Fagotto		19
8	Posaune		20
8	Bombard		18
4	Bombard Melody	[coupler]	18
8	Chalumeau		19
4	Octave Oboe		19

Solo – Manual 4

16	Major Flute	59
10⅔	Quint Flute	59
8	Stentor Diapason	71
8	Diapason	79
8	Tibia Rex	60
8	Major Flute	59
8	Hohl Flute	61
8	Flute Overte	62
8	Cello Pomposa	66
8	Cello Celeste	67
8	Violin	68
8	Violin Celeste	69
5⅓	Quint Flute	59
4	Octave Stentor	72
4	Octave	79
4	Wald Flute	63
4	Major Flute	59
4	Viola Pomposa	70
2	Harmonic Piccolo	65
9 Rk.	Grand Chorus	79
4 Rk.	Carillon Mixture	80
16	Tuba Magna	73
16	Trumpet Profunda	74
10⅔	Quint Trumpet	74
8	Tuba Imperial	75
8	Tuba Magna	73
8	Trumpet Royal	776
8	Trumpet Profunda	74
8	Bugle	78
8	English Post Horn	77
8	French Horn	104
5⅓	Magna Fifth	73
4	Tuba Clarion	73
4	Trumpet Clarion	74
	Brass Chorus [floating]	
16	Solo	
4	Solo	
8	Choir	
8	Great	
8	Fanfare	
4	Fanfare	
8	Echo	
	String I	
	String II	
	String III	
	Gallery I Reeds	
	Gallery II Flutes	
	Gallery III Diapasons	
	Gallery IV Orchestral	

Solo-Great – Manual 4 [duplex department]

16	Wald Flute	81
16	Tibia Clausa	83
16	Contra Geigen	82
10⅔	Wald Quint	81
10⅔	Quint Tibia	83
8	Diapason Phonon	84
8	Horn Diapason	85
8	Geigen Principal	82
8	Gemshorn	87
8	Gemshorn Celeste [flat]	88
8	Wald Flute	81
8	Tibia Clausa	83
8	Doppel Gedeckt	86
8	Viola d' Gamba	89
8	Vox Celeste	90
6⅖	Terz Gemshorn	91
5⅓	Wald Quint	81
5⅓	5th Gemshorn	92
4⅐	7th Gemshorn	93
4	Octave Phonon	84
4	Octave	85
4	Octave Geigen	82
4	Gemshorn	87
4	Gemshorn Celeste	88
4	Wald Flute	81
4	Stopped Flute	83
4	Doppel Flute	86
4	Viola	89
4	Viola Celeste	90
3⅕	10th Gemshorn [Celeste]	88
3⅕	10th Tenth [Terz]	91
2⅔	12th Flute [Wald]	81
2⅔	12th Minor [Tibia]	83
2⅔	12th Gemshorn [Quint]	92
2⅔	12th Flute	64
2⅐	14th Gemshorn [Sept]	93
2	15th Fifteenth [Horn]	85
2	15th Geigen	82
2	15th Gemshorn	87
2	15th Piccolo [Wald]	81
1⅗	17th Gemshorn [Celeste]	88
1⅗	17th Gemshorn [Terz]	91
1⅓	19th Gemshorn [Quint]	92
1⅐	21st [Sept.]	93
1	22nd [Gems]	87
⅘	24th [Terz]	91
⅔	26th [Quint]	92
½	29th [Gems]	87
¼	36th [Gems]	87
16	Oboe Horn	95
16	Krummhorn	100
16	Saxaphone	96
16	English Horn	97
16	French Horn	98
16	Vox Baryton	99
8	Oboe	95

8	Clarinet		101
8	Krummhorn		100
8	Orchestral Saxaphone		102
8	Saxaphone		96
8	English Horn		97
8	Orchestral Horn		103
8	French Horn		98
8	Kinura		106
8	Vox Humana		105
8	Vox Humana	[Baryton]	99
4	Octave Horn		95
4	Krummhorn		100
4	Saxaphone		96
4	English Horn		97
4	French Horn		98
4	Vox Humana		105
	Chimes		108
8	Harp		107
4	Harp		107
4	Xylophone		94
2	Xylophone		94

[The 31st harmonic of the 8-foot series, 2⁄15′, is curiously absent from the organ's harmonic registers.]

Fanfare – Manual 5

16	Flute Major		197
8	Stentor Diapason		212
8	Stentorphone		199
8	Stentor Flute		198
8	Pileata Magna		200
8	Gamba Tuba		304
8	Gamba Tuba Celeste		305
4	Stentor Octave		212
4	Major Flute		197
4	Flute Octaviant		204
4	Gamba Clarion		306
2⅔	12th Recorder		202
2	15th Fife		203
7 rks.	Stentor Mixture		212
5 rks.	Cymbal Mixture		204
6 rks.	Harmonic Mixture		307
16	Contra Posaune		205
16	Contra Bombardon		206
16	Contra Trombone		299
10⅔	Quint Tromba		209
8	Tuba Harmonic		207
4	Tuba Melody		207
8	Ophicleide		208
8	Posaune		205
8	Bombard		206
8	Tromba		209
8	Trombone		299
6⅔	Tromba Tierce		210
5⅓	5th Tromba		209
5⅓	5th Trombone		299
4	Harmonic Clarion		207
4	Major Clarion		211
4	Octave Posaune		205
4	Clarion		206
4	Trombone Clarion		299
3⅕	10th Tromba		210
2⅔	12th Tromba		209
2	15th Clarine		206
16	Choir		
8	Choir		
4	Choir		
8	Great		
16	Swell		
8	Swell		
4	Swell		
8	Solo		
8	Echo		
	Gallery I Reeds		
	Gallery II Flutes		
	Gallery III Diapasons		
	Gallery IV Orchestral		
	String I		
	String II		
	String III		

Echo – Manual 6

16	Contra Violone		298
16	Contra Gamba		213
16	Contra Spire Flute		214
8	Diapason		215
8	Waldhorn		219
8	Clarabella		220
8	Spire Flute		214
8	Spitz Flute		216
8	Flute Celeste I	[Spitz]	217
8	Flute Celeste II	[2 rks., flat]	218
8	Flute Sylvestre		222
8	Flute Celeste		223
8	Tibia Mollis		221
8	Violone		298
8	Violone Celeste		319
8	Gamba		213
4	Open Flute		220
4	Rohr Flute		224
4	Cone Flute		214
4	Viol		298
4	Viol Gamba		213
3⅕	10th Spitz	[Celeste]	218
2⅔	12th Flute	[Clara]	220
2⅔	12th Spire		214
2	15th	[Clara]	220
2	15th Spire		214
1⅗	17th Spitz	[Celeste]	218
1⅓	19th Spire		214
1	22nd Spire		214
6 Rk.	Mixture Aetheria		225
16	Tuba d'Amour		231
16	Contra Bassoon		226
16	Chalumeau		227
16	Vox Humana		230
8	Tuba d'Amour		231
8	Trumpet Minor		228
8	Clarinet		227
8	Cor d'Amour		229
8	Bassoon		226
8	Vox Humana I		303
8	Vox Humana II		230
4	Octave Clarinet		227
4	Tuba d'Amour		231
4	Octave Bassoon		226
4	Vox Humana		230
	Chimes		232
16	Echo		
4	Echo		
8	Choir		
8	Great		
8	Solo		
8	Fanfare		
	String I		
	String II		
	String III		
	Gallery I Reeds		
	Gallery II Flutes		
	Gallery III Diapasons		
	Gallery IV Orchestral		

Bombard – Manual 7

This keyboard controls no stops of its own, but the four floating Gallery departments can be transferred to this keyboard, essentially making it the home manual for these divisions.

Gallery Masters

Gallery I Reeds to Bombard
Gallery II Flutes to Bombard
Gallery III Diapasons to Bombard
Gallery IV Orchestral to Bombard

Gallery I – Floating

16	Contra Diaphone		233
8	Diaphone		233
8	Diapason		318
4	Octave		318
7 Rk	Mixture Mirabilis		318
16	Trumpet Mirabilis		235
16	Trumpet Melody	[coupler]	235
8	Tuba Maxima		234

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8	Trumpet Imperial		235
4	Clarion Mirabilis		234
4	Clarion Melody	[coupler]	234
4	Clarion Real		235

Gallery II – Floating

16	Flute Maggiore		242
8	Jubal Flute		243
4	Flute Melody	[*Jubal*, coupler]	243
8	Harmonic Flute		244
4	Melodic Flute		242
4	Harmonic Flute		245
2⅔	Harmonic Twelfth		246
2	Harmonic Piccolo		247
3 Rk.	Harmonic Mixture		248
16	Gallery II Flutes		
4	Gallery II Flutes		

Gallery III – Floating

16	Contra Diapason		236
8	Diapason I		237
8	Diapason II		238
4	Octave I		239
4	Octave II		236
2	15th Fifteenth		240
4 Rk.	Mixture		241
16	Grand Piano		A
8	Grand Piano		A
4	Grand Piano		A

Gallery IV – Floating

16	Contra Saxaphone		249
8	Brass Trumpet		300
8	Egyptian Horn	[orig. *Bazu*]	302
8	Euphone		301
8	Major Clarinet		253
8	Major Oboe		250
8	Muset Mirabilis		251
8	Cor D'Orchestre		252
8	Saxaphone		249
4	Octave Saxaphone		249
16	Gallery Orchestral IV		
4	Gallery Orchestral IV		

String I – Floating

16	Contra Basso		254
8	Cello		255
8	Cello Celeste I	[2 rks.]	256
8	Cello Celeste II	[2 rks.]	257
8	Violins I	[2 rks.]	258
8	Violins II	[2 rks.]	259
8	Violins III	[2 rks.]	260
8	Violins IV	[2 rks.]	261
8	Viol Secundo I	[2 rks.]	262
8	Viol Secundo II	[2 rks.]	263
4	Octave Viola		254
4	Viol Secundo		264
16	String I		
4	String I		
16	String Melody		
4	String Melody		
	String Pizzicato		
	String Separation		

String II – Floating

16	Double Bass		265
16	Contra Bass		266
16	Contra Viol		267
8	Viola Diapason		268
8	Viol Cello		269
8	Cello Phonon		270
8	Cello		271
8	Cello Celeste		272
8	Viola Phonon		273
8	Viola Celeste		274
8	Violin Phonon		275
8	Violin		276
8	Viol Celeste I	[2 rks.]	277
8	Viol Celeste II	[2 rks.]	278
8	Viol Celeste III	[2 rks.]	279
8	Viol Celeste IV	[2 rks.]	280
8	Viol Celeste V	[2 rks.]	281
4	Viol Principal		284
4	Violin		282
4	Viola		283
4	Octave Cello I		265
4	Octave Cello II		266
4	Octave Violin		267
5⅓	Quint Flute		287
4	Stopped Flute		287
2⅔	12th Flute		288
2	15th Piccolo		287
5 Rk.	String Mixture		285
8	Tromba d'Amour		286
16	String II		
4	String II		
16	String Melody		
4	String Melody		
	String Pizzicato		
	String Separation		

String III – Floating

8	Cello Celeste I	[2 rks.]	289
8	Cello Celeste II	[2 rks.]	290
8	Viola Celeste	[2 rks.]	291
8	Violins	[2 rks.]	292
8	Violins II	[2 rks.]	293
8	Violins III	[2 rks.]	294
8	Violins IV	[2 rks.]	295
8	Viol Secundo	[2 rks.]	296
8	Cor Anglais		297
16	String III		
4	String III		
16	Grand Piano		A
8	Grand Piano		A
4	Grand Piano		A

Tremolos Left side

Trem Master [all tremolos]
String I
String III
Fanfare Pileata
Fanfare
Gallery IV
Sw-Ch Vox Humana
Swell-Choir
Swell
Choir Philomela
Choir
Open Choir

Tremolos Right side

Great Tibia
Solo 20″
Gt-Solo Organ Tone
Gt-Solo Wood Wind
String II
Echo

Expression Pedal Assignment Switches

[6 assignable pedals in total, plus Crescendo]

Expression Pedal Assignments I-VI

Solo
Great-Solo Organ
Great-Solo Orchestral
Brass Chorus
Swell
Swell-Choir
Choir
Echo
Fanfare
Percussion
Gallery II
Gallery IV
String I
String II
String III

Great-Solo Organ	*Reverse*
Great-Solo Orchestral	*Reverse*
Swell-Choir	*Reverse*
String I	*Reverse*
String II	*Reverse*

CONSOLE CONTROLS

Pistons (double touch, with pedal combinations on second touch]
Great 1-15
Swell 1-15
Choir 1-20
Solo 1-15
Fanfare 1-8
Echo 1-10
Galleries I-IV 1-3 each
Pedal 1-18
General 1-36
Couplers 1-4
Tremolos 1-4
Setter

Combinations (bottom left-side jamb): Brass 1-3; String I 1-4; String II 1-6; String III 1-4

Cancels (bottom right side): 19 divisional cancels for each department plus tremolos, couplers, percussions, general)

Blowers

Generator	5 hp
Great low	75
Great high	100
Swell low	125
Swell high	100
Fanfare	100
Echo	75

Compressor 50 (to step up Gr. to 100″)

Toe Pistons & Spoons

Setter
Signal
Console 2 OFF
Pedal 1,4,7,10,13,15
Ped Subs Off [all stops below 16′]
Mixtures Off
16′ Stops Off
16′ Couplers Off
4′ Couplers Off

Toe Reversibles

Sw. to Gt
Gal'ry I to Great
Gal'ry II to Great
Gal'ry III to Great
Gal'ry I to Choir
Gal'ry II to Choir
Gal'ry III to Choir
Gr. to Ped.
Sw. to Ped.
Ch. to Ped.
Solo to Ped.
Fanfare to Ped.
Piano F

(With indicators)

Sfz. I [red lamp]
Sfz. II [red lamp]
Cres. MF
Cres F
Cres FF
Cres FFF
Crescendo selectables may be used individually or in combination; white lamps.
100″ Reeds Off [red]
50: Stops Off [green]
64′ Off [64, 42⅔, harmonic stops of the 64′ series; white]
32′ Off [32, 21⅓, all stops of the 32′ series; white]

Rocking Tablets

These disengage couplers from piston second touch.
Great II Touch Couplers Off
Swell II Touch Couplers Off
Choir II Touch Couplers Off
Solo II Touch Couplers Off
Fanfare II Touch Couplers Off
Echo II Touch Couplers Off
Manual 16′ Couplers Off
Manual 4′ Couplers Off
All Mixture Stops Off
Pedal Sub Stops Off
Console I Off
Console II Off

ADDITIONAL DETAILS: The inter-manual couplers, i.e. *Swell to Great, Great to Fanfare, etc.*, will also couple a division's associated ancillary departments. The intra-manual couplers, *Swell 16′, Swell 4′,* etc. will affect the ancillary departments associated with the host division as well. The intra-manual couplers of the floating departments (*String, Gallery, etc.*) will couple through to the division they are transferred to, but the sub and super couplers for departments with a home manual, *Swell, Choir, etc.,* do not read through.

For the *Grand* divisions playing on the seven-octave keyboards, a register's pitch designation is that for the standard bass C, and operate only when a Grand "On" stop key has been activated. For the *Grand* divisions playing on the seven-octave keyboards, which are largely derived from duplexed pedal voices, a register's pitch designation is that for the standard bass C. Because of the additional lower octave, this means that all *Grand* stops have the capability of sounding pipes down to an octave lower than the engraved pitch on the tab. These registers operate only when the "Grand Great On" or "Grand Choir On" stop keys have been activated.

The divisional expression reversibles when activated, operate the shutters of the designated division in contrary motion to that of the assigned pedal.

While there are stop tabs for String III and Percussion on the Expression Pedal selectors, they serve no purpose. The percussion traps are unenclosed in the Right Stage chamber, and the String III division is within the same chamber as the Fanfare, meaning the Fanfare shades control expression for String III.

The console kiosk has lattice work in its upper section to allow organ tone to reach the semi-enclosed organist, and to dissipate heat from the console electrical systems. The original imposing console design called for an additional four wedding-cake tiers. The rationale behind the large duplexed divisions is to provide tonal material and tone-color shadings not available on the home manuals to which they are assigned.

SOURCES: Nathan Bryson, Carl Hersom, Excel spreadsheet; Stephen Smith, *Atlantic City's Musical Masterpiece*; *Four Essays* by Stephen Smith;- David Junchen, *Encyclopedia of the American Theatre Organ, Vol. I*; photocopy of typewritten specification signed by Emerson Richards 9/21/60.

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Chamber Analysis

The stops in red and green are the high-pressure stops on 100″and 50″ respectively, and so identified by similarly colored jewels on the stop keys. The scale information is based on the lowest-pitched pipe in the rank.

The divisions and stops in italics are off-line and awaiting restoration as of January 2022. The ranks having two scale numbers, ex. 40-44, indicate the bottom and top diameters of tapered ranks. The rank annotations in the Notes are as described in various contracts by Richards. Additional ancillary information in the Notes column is extracted from a variety of sources.

Voice numbers seemingly out of order in the numerical chamber index, i.e. those in the 300's, represent tonal amendments made in the third and final revision of the contract.

SOURCES: Stephen Smith, *Atlantic City's Musical Masterpiece,* (2002); Nathan Bryson spread sheet; *Organ for Convention Hall*, Emerson Richards, *The American Organist* 1929, 278-285; reprinted in *the O.H.S. Philadelphia 2016 Diamond Jubilee Commemorative Anthology*, 276-285.

Voice #	Pitch		Rank	W.P.	Pitches Available	Scaling	Pipes	Notes
PEDAL RIGHT ~ GRAND GREAT	*Right Stage Chamber, unenclosed. Pedal flues halve on the 19th note.*							
1	32′	Tibia Clausa	20″	32, 21⅓, 16, 10⅔, 8, 5⅓, 4, 2⅔, 1	Sc. 24″ x 30″, wood	85		Voiced by Arthur Hays
2	16′	Diaphone Phonon	50″	16, 10⅔	Sc. 24″ x 24″, wood	39		Full tone, minimum development
3	16′	Tibia Major	30″	16, 8, 4, 10⅔, 5⅓, 2⅔, 1⅓	Sc. 9″ x 20″, wood	85		Double languid
4	16′	Principal	30″	16, 10⅔, 8, 5⅓, 4, 2	Sc. 11″ x 13″, wood/zinc-lead	109		Double languid, maximum harmonic development
5	8′	Contra Viol	30″	16, 8, 4, 2⅔	Sc. 40, spotted metal	85		Double languid, max power
6	12⅘′	Gross Tierce	20″	12⅘, 6⅖, 3⅕, 1⅗	Sc. 32, zinc-lead	68		Minimum harmonics
7	9⅐′	Septieme	20″	9⅐, 4⅘, 2⅖, 1⅐	Sc. 40, zinc/lead	68		Minimum harmonics
8	32′	Contra Bombardon	40″	32, 16, 10⅔, 8, 5⅓	Sc. 24″, zinc	85		Big tone, closed sonority
9	16′	Grand Ophicleide	100″	16, 8	Sc. 15″ x 15″, wood/zinc-lead	85		Dominate pedal, max harmonics
10	16′	Trumpet	20″	16, 8, 4, 5⅓	Sc. 8½″, lead	97		
17	64′	Dulzian Diaphone	35″	64, 42⅔, 32, 21⅓, 16, 10⅔, 8, 4	Sc. 27″ x 27″, wood/zinc-lead	85		Tromba quality
PEDAL LEFT ~ GRAND CHOIR	*Left Stage Chamber, unenclosed*							
11	32′	Contra Diaphone	50″	32, 16, 8, 4	Sc. 30″ x 30″, wood/zinc-lead	85		Most commanding pedal flue voice
12	32′	Contra Diapason	20″	32, 16, 10⅔, 8, 4, 2	Sc. 24″, zinc-lead	97		Double languid, characteristic tone, max power
13	16′	Diaphonic Diapason	35″	16, 8	Sc. 14″, zinc-lead	85		Double languid, bright diapason character
14	16′	Bass Viol	20″	16, 8	Sc. 7″ x 9″, wood/spotted	85		Double languid, String Bass tone
15	16′	Tibia Clausa	20″	16, 8, 4, 2, 1	Sc. 13″ x 16″ wood	85		Double languid, full, dull tone
16	VII	Stentor Sesquialtera	20″	8, 5⅓, 4, 3⅕, 2⅔, 1⅐, 1	Sc. 42, lead	224		Wide mouth, as powerful and brilliant as possible to top reed chorus
18	32′	Contra Bombard	50″	32, 16, 8, 4	Sc. 24″ x 24″, wood/zinc-lead	85		Tuba body of tone with Trumpet brilliance
19	32′	Contra Fagotto	20″	32, 16, 8, 5⅓, 4, 2⅔, 2	Sc. 8″, zinc-lead	97		Quiet with bite and character
20	16′	Major Posaune	50″	16, 8	Sc. 9″, zinc-lead	44		Brilliant tone
320	16′	Major Diapason	20″	16	Sc. 20″ x 24″, wood	32		Double languid, one of two straight pedal stops

GREAT *Right Stage Chamber, unenclosed. Great in general is a big Diapason Organ with four separate choruses having their own harmonic development, on 3¾", 7½", 12", and 20" pressure. All flues halve on the 16th note.*

21	32′	Principal	20″	32, 8, 2	Sc. 15″ x 18″, wood/zinc-lead	121	Double languid, harmonic bridges, telling tone
22	16′	Double Diapason I	20″	16, 4	Sc. 12′ x 14″, wood/zinc-lead	97	Double languid, full fundamental tone
23	16′	Double Diapason II	15″	16	Sc. 28, wood/zinc-lead	73	Double languid, for 15″ chorus
24	16′	Double Diapason III	10″	16	Sc. 32, zinc-lead	73	For 10″ chorus, "free" tone
25	10⅔′	Sub Quint	15″	10⅔	Sc. 33, zinc-lead	73	Normal Diapason tone
26	8′	Diapason I	30″	8	Sc. 34, zinc-lead	73	Double languid, as powerful as possible
27	8′	Diapason II	30″	8	Sc. 38, zinc-lead	73	Double languid, more development than I
28	8′	Diapason III	20″	8	Sc. 39, zinc-lead	73	Double languid, well developed
29	8′	Diapason IV	15″	8	Sc. 38, zinc-lead	73	Smoother than III
30	8′	Diapason V	15″	8	Sc. 41, zinc-lead	73	Quite brilliant
31	8′	Diapason VI	15″	8	Sc. 37, zinc-lead	73	Leathered lip, Hope-Jones phonon type
32	8′	Diapason VII	10″	8	Sc. 42, zinc-lead	73	Tone between VI and VIII
33	8′	Diapason VIII	10″	8	Sc. 44-40, zinc-lead	73	Geigen
34	8′	Diapason IX	10″	8	Sc. 39, zinc-lead	73	Leathered lip, wide-mouth Schulze
35	8′	Diapason X	4″	8	Sc. 42, spotted metal	73	Wide-mouth Schultz, as St. Mark's #3
36	5⅓′	Quint	20″	5⅓	Sc. 45, lead	73	Normal Diapason
37	4′	Octave I	20″	4	Sc. 48, lead	73	Double languid, balance 20″ chorus
38	4′	Octave II	20″	4	Sc. 52-48, lead	73	Double languid, balance 20″ chorus
39	4′	Octave III	15″	4	Sc. 50, lead	73	For 15″ chorus
40	4′	Octave IV	10″	4	Sc. 54, lead	73	For 10″ chorus
41	4′	Octave V	10″	4	Sc. 56, spotted metal	73	For 10″ chorus
42	3⅕′	Gross Tierce	15″	3⅕	Sc. 55, lead	73	Normal diapason quality
43	2⅔′	Major Twelfth	20″	2⅔	Sc. 54, lead	73	Normal diapason quality
44	2′	Fifteenth I	20″	2	Sc. 60, lead	73	Double languid, to supplement 20″ chorus
45	2′	Fifteenth II	15″	2	Sc. 62, lead	73	To supplement 15″ chorus
46	2′	Fifteenth III	10″	2	Sc. 52, lead	73	To supplement 10″ chorus
47	II	Rausch Quint	30″	5⅓, 4	zinc-lead	146	Dominating, telling in full chorus
48	II	Rausch Quint	30″	2⅔, 2	lead	146	Same as #47
49	*XI*	*Grand Cornet*	*20″*	*8, 5⅓, 4, 3⅕, 2⅔, 2⅔, 2, 1⅗, 1⅓, 1*	*zinc-lead*	*803*	*Full, dominating, balance chorus except Diap. I-III*
50	V	Sesquialtera Major	20″	3⅕, 2,1⅗, 1⅓, 1	Sc. 38, lead	365	More brilliant than preceding mixtures
51	V	Schulze Mixture	4″	2⅔, 2, 1⅓, 1, ⅔	spotted metal	365	Wide-mouth, low-cut, as at Armley and St. Mark's
52	VI	Furniture	15″	1⅗, 1, ⅔, ½, ⅓, ¼	Sc. 38, spotted metal	414	The acute Great mixture, adds clarity to bass
53	8′	Harmonic Flute	15″	8	Sc. 40, zinc-lead	73	Big, brilliant tone
54	8′	Flute Overte	4″	8	Sc. 40, zinc-lead	73	Similar to High School organ
55	4′	Harmonic Flute	15″	4	Sc. 50, lead	73	Big, brilliant tone
56	16′	Trumpet	30″	16	Sc. 6½″, zinc-lead	73	Brilliant intonation
57	8′	Harmonic Trumpet	30″	8	Sc. 5½″, zinc-lead	73	Clear, brilliant
58	4′	Harmonic Clarion	30″	4	Sc. 3¾″, zinc-lead	73	To top trumpet chorus

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SOLO *Right Stage Chamber, enclosed.*

59	16′	Major Flute	20″	16, 10⅔, 8, 5⅓, 4	Sc. 12″ x 14″, wood	85	Double languid, dominating, clear, full, developed
60	8′	Tibia Rex	30″	8	Sc. 30, zinc-lead	61	Double languid, full, weighty, as powerful as possible
61	8′	Hohl Flute	20″	8	Sc. 6⅜″ x 7⅜″, wood	61	Bearded, bright, for solos
62	8′	Flute Overte	20″	8	Sc. 36, zinc-lead	61	Less developed than Hohl flute
63	4′	Wald Flute	30″	4	Sc. 46, zinc-lead	61	Double languid, leathered lip
65	2′	Harmonic Piccolo	20″	2	Sc. 49, zinc-lead	61	Timbre creator, part of flute chorus
66	8′	Cello Pomposa	20″	8	Sc.50, spotted metal	61	Broad tone, contrasting to those in String Organs
67	8′	Cello Celeste	20″	8	Sc. 50, spotted metal	61	Like #66
68	8′	Violin	20″	8	Sc. 54-50, spotted metal	61	Broad tone, contrasting to those in String Organs
69	8′	Violin Celeste	20″	8	Sc. 54-50, spotted metal	61	Broad tone, contrasting to those in String Organs
70	4′	Viola Pomposa	20″	4	Sc.60, spotted metal	61	Broad tone, contrasting to those in String Organs
71	8′	Stentor Diapason	30″	8	Sc. 32, zinc-lead	61	Double languid, brilliant, as assertive as possible
72	4′	Stentor Octave	30″	4	Sc. 44, zinc-lead	61	Double languid, brilliant, as assertive as possible
73	16′	Tuba Magna	50″	16, 8, 5⅓, 4	Sc. 12″ x 12″, zinc-lead	85	Powerful, clear, full
74	16′	Trumpet Profunda	30″	16, 10⅔, 8	Sc. 9″, zinc-lead	85	Trumpet character, brilliant
75	8′	Tuba Imperial	100″	8	Sc. 8″, zinc-lead	61	Closed tone, most powerful in division
76	8′	Trumpet Royal	30″	8	Sc. 5½″, zinc-lead	61	“Free” tone, voiced “all out”
77	8′	English Post Horn	30″	8	Sc. 5″, spotted metal	61	Extremely thin, brilliant tone
78	8′	Bugle	50″	8	Sc. 5¼″, brass	61	Gottfried-type, fortissimo orchestral tone
104	8′	French Horn	20″	8	Sc. 6¼ “, zinc-lead	61	Details will be given to successful bidder
79	IX	Grand Chorus	30″	8, 5⅓, 4, 2⅔, 2, 1⅓, 1, ⅔, ½	zinc-lead	549	Top reed chorus, powerful voicing
79a	8′	Diapason	30″	8	from Gr Ch IX		
79b	8′	Octave	30″	8	from Gr Ch IX		
80	IV	Carillon	30″	1⅗, 1⅓, 1⅐, 1	spotted metal	244	Powerful, free tone, prominent 17th

SOLO – GREAT *(Organ Tone) Right Stage Chamber, enclosed.* *The Solo-Great duplexed divisions are to provide accompanimental voices to avoid duplication between divisions, and not affecting the choruses. The original idea of a triplex Great-Solo-Echo was scrapped.*

81	16′	Wald Flute	15″	16, 10⅔, 8, 5⅓, 4, 2⅔, 2	Sc. 10″ x 10″, wood	97	Full, bright, liquid
82	16′	Geigen Principal	15″	16, 8, 4, 2	Sc. 35, zinc-lead	97	Brilliant diapason
83	16′	Tibia Clausa	15″	16, 10⅔, 8, 4, 2⅔	Sc. 10″ x 12″, wood	97	Dull tone
84	8′	Diapason Phonon	15″	8, 4	Sc. 38, zinc-lead	73	Leathered lip, powerful, harmonically developed
85	8′	Horn Diapason	15″	8, 4, 2	Sc. 40, zinc-lead	85	Characteristic tone
86	8′	Doppel Gedeckt	15″	8, 4	Sc. 4″ x 7″, wood	73	Full, smooth, liquid
87	8′	Gemshorn	15″	8, 4, 2, 1, ½, ¼	Sc. 44, zinc-lead	121	Big gemshorn quality
88	8′	Gemshorn Celeste	15″	8, 4, 3⅕, 1⅗	Sc. 44, zinc-lead	89	Like #87
89	8′	Viola d’ Gamba	15″	8, 4	Sc. 55, tin	73	Quiet, broad

90	8′	Viol Celeste	15″	8, 4	Sc. 55, tin	73	Like #89
91	6⅖′	Gemshorn Terz	15″	6⅖, 3⅕, 1⅗, ⅘	Sc. 46, zinc-lead	97	Weighty enough to be useful in combinations
92	5⅓′	Gemshorn Quint	15″	5⅓, 2⅔, 1⅓, ⅔	Sc. 49, zinc-lead	109	Like #91
93	4⅘′	Gemshorn Septieme	15″	4⅘, 2⅔, 1⅘	Sc. 55, lead	97	Like #91

SOLO – GREAT *(Orchestral) Right Stage Chamber, enclosed. The original idea for this section was to be a triplex Great-Solo-Echo, and that idea was later scrapped.*

94		Xylophone		4, 2	wood bars	49 bars	
64	2⅔′	Flute Twelfth	15″	2⅔	Sc. 3¾″ x 5″, wood	73	Powerful, bright clear, can be a solo
95	16′	Oboe Horn	15″	16, 8, 4	Sc. 4½″, zinc-lead	97	Details for these reeds to be developed by the architect
96	16′	Saxophone	15″	16, 8, 4	Sc. 3″, zinc	97	
97	16′	English Horn	15″	16, 8, 4	Sc. 1¼″, spotted metal	97	
98	16′	French Horn	15″	16, 8, 4	Sc. 7½″, zinc-lead	97	
99	16′	Vox Baryton	15″	16, 8	Sc. 7″, zinc-lead	97	
100	16′	Krummhorn	15″	16, 8, 4	Sc. 5″, zinc-lead	97	
101	8′	Clarinet	15″	8	Sc. 1¾″, zinc-lead	85	
102	8′	Orchestral Saxophone	15″	8	Sc. 7½″, zinc-lead, brass bells	85	
103	8′	Orchestral Oboe	15″	8	Sc. 3″, spotted metal	85	
105	8′	Vox Humana	15″	8, 4	Sc. 6¼″, zinc-lead	85	
106	8′	Kinura	15″	8	Sc. 1¾″, metal	73	
107		Harp		8, 4	metal bars	61 bars	
108		Chimes		8	metal tubes	25 tubes	

BRASS CHORUS *Right Forward Chamber, enclosed.*

109	*16′*	*Trombone*	*25″*	*16*	*Sc. 8″, zinc-lead*	*73*	*Full and powerful*
110	*8′*	*Trombone I*	*25″*	*8*	*Sc. 6½″, zinc-lead*	*73*	*Brighter of the two 8′ reeds*
111	*8′*	*Trombone II*	*25″*	*8*	*Sc. 5½″, zinc-lead*	*73*	*Smoother than No. I*
112	*5⅓′*	*Tromba Quint*	*20″*	*5⅓*	*Sc. 4¼″, zinc-lead*	*73*	*Smooth, closed tone*
113	*4′*	*Trombone*	*25″*	*4*	*Sc. 4½″, zinc-lead*	*73*	*More open tone than the mutation reeds*
114	*2⅔′*	*Trombone Twelfth*	*20″*	*2⅔*	*Sc. 3¼″, zinc-lead*	*73*	*Smooth, closed tone*
115	*2′*	*Trombone*	*25″*	*2*	*Sc. 3½″, zinc-lead*	*73*	*Pipes moved to mixture, now flues*
116	*III*	*Tierce Mixture*	*20″*	*3⅕ (reed), 1⅗, 1*	*zinc-lead*	*219*	*3⅕′ was originally 2′, open flue tone; incorporates orig. pipes from #115*

SWELL *Left Stage Chamber, enclosed.*

117	16′	Double Diapason	15″	16, 4	Sc. 32, zinc-lead	104	Double languid, full but like Geigen
118	8′	Diapason I	15″	8	Sc. 40, zinc-lead	80	Full but bright
119	8′	Diapason II	15″	8	Sc. 45, zinc-lead	80	More restrained, accompanimental
120	8′	Waldhorn	15″	8	Sc. 43, zinc-lead	80	Richards scale, “walls breaking in toward top”
121	4′	Octave	15″	4	Sc. 50, lead	80	Voiced free, octave to I
122	2′	Fifteenth	15″	2	Sc. 63, lead	80	Follows Octave 4′
123	V	Furniture	15″	2, 1⅓, 1, ⅔, ½	Sc. 42, spotted metal	400	Brightly voiced
124	8′	Tibia Plena	15″	8	Sc. 7⅛″ x 9″, wood	80	Leathered lip, Hope-Jones, blend with reeds
125	8′	Hohl Flute	15″	8	Sc. 6″ x 7″, wood	80	Mouth on wide side, brilliant tone

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126	8′	Gross Gedeckt	15″	8	Sc. 6½″ x 9″, wood	80	Full and powerful, like exaggerated St. Diapason
127	8′	Harmonic Flute	15″	8	Sc. 44, zinc-lead	80	Medium strength
312	8′	Harmonic Flute Celeste	15″	8	Sc. 44, zinc-lead	80	Like unison rank
128	4′	Ocarina	15″	4	Sc. 52-46, tin	80	Double languid, leathered lip, tapered, brilliant and dominating
129	4′	Traverse Flute	15″	4	Sc. 3″ x 4″, wood	80	Imitative, orchestral
313	4′	Silver Flute	15″	4	Sc. 5″-3½″, spotted metal	80	Tapered
130	2′	Orchestral Piccolo	15″	2	Sc. 2½″ x 3½″, wood	80	Voiced “all out”
131	16′	Contra Gamba	15″	16, 4	Sc. 50, spotted metal	104	Like orchestral Double Bass
132	8′	Violin	15″	8	Sc. 70, tin	80	Keenest of the Swell strings
133	8′	Violin Celeste I - 2 rks	15″	8	Sc. 72, tin	148	Keen and powerful
134	8′	Violin Celeste II - 2 rks	15″	8	Sc. 66, spotted metal	148	Broader and more tender, Viola quality
135	8′	Gamba	15″	8	Sc. 56-50, spotted metal	80	Broad Gamba tone
136	8′	Gamba Celeste	15″	8	Sc. 56-50, spotted metal	80	Same as Gamba
137	4′	Gambette	15″	4	Sc. 70-66, tin	80	Octave for the Swell string choir
138	16′	Double Trumpet	30″	16, 4	Sc. 6″, zinc-lead	104	Double of Prime reed chorus
139	8′	Harmonic Trumpet	30″	8	Sc. 4½″, zinc	80	Voiced to produce body tone and harmonics
140	8′	Field Trumpet	30″	8	Sc. 8″, zinc-lead	80	More harmonically developed than Harm. Tr.
141	4′	Trumpet Clarion	30″	4	Sc. 3½″, zinc-lead	80	Octave of the Secondo reed chorus
142	16′	Double Horn	15″	16, 4, VI	Sc. 7½″, zinc-lead	104	Double of 2nd chorus, smooth and broad
143	8′	Posaune	15″	8	Sc. 6″, zinc-lead	80	2nd chorus, powerful with as much body as fiery intonation will permit
144	8′	Cornopean	15″	8	Sc. 5½″, zinc-lead	80	2nd chorus, smooth
145	8′	Flugel Horn	15″	8	Sc. 3⅜″, zinc-lead	80	Large-scale, organ-tone Oboe
314	8′	Muted Trumpet	15″	8	Sc. 1½″, spotted metal	80	
315	8′	Krummhorn	15″	8	Sc. 2½″, zinc-lead	80	
316	8′	Vox Humana	15″	8	Sc. 1⅝″, zinc-lead	80	
146	VII	Plein Jeu	15″	2, 1⅓, 1, ⅔, ½, ⅓, ¼	Sc. 38, spotted metal	560	Top of reed chorus, brilliant, free diapason tone
317	VIII	Cymbal	15″	2⅔, 2, 1⅗, 1⅓, 1⅐, 1, ⅝, ⅔	Sc. 42, spotted metal	640	

SWELL – CHOIR *Left Stage Chamber, enclosed. Emphasis is placed on the Gemshorn family. The mutation series is intended for synthetic work and voiced to be devoid of all but fundamental tone. Stopped metal is considered best for this.*

147	16′	Gross Doppel Gedeckt	15″	16, 8, 4, 2	Sc. 9″ x 14″, wood	97	Only assertive voice in this division
148	16′	Cone Gamba	15″	16, 8, 5⅓, 4	Sc. 46, spotted metal	97	Part of Gemshorn chorus, like High School
311	16′	Stopped Diapason	10″	16, 8, 4, 2⅔	Sc. 6″ x 8¼″, wood	104	Voiced by Arthur Hays, 1-16 on 15″ w.p.
149	8′	Clarabella	15″	8, 4, 2⅔	Sc. 4¾″ x 6″, wood	92	More assertive than normal, more mellow than Echo #220
150	8′	Doppel Spitz Flute	10″	8, 4, 2	Sc. 3¾″ x 4″, wood	97	Tapered, tone combination of Doppel Flute and Spitz Flute
151	4′	Zauber Flute	15″	4, 2, 1	Sc. 3¾″ x 3½″, wood	97	Pure, liquid tone
152	8′	Gemshorn	15″	8, 4, 2, 1, ½, ¼	Sc. 50, zinc-lead	97	Characteristic tone
153	8′	Gemshorn Celeste I	15″	8, 5⅓, 2⅔, 1⅓	Sc. 53, zinc-lead	97	

154	8′	Gemshorn Celeste II	15″	8, 3⅕, 1⅗	Sc. 53, zinc-lead	97	
155	6⅖′	Third	10″	6⅖, 3⅕, 1⅗, ⅘	Sc. 44, zinc-lead	97	All mutations in S-C to be free of harmonics, dull
156	5⅓′	Fifth	10″	5⅓, 2⅔, 1⅓, ⅔, ⅓	Sc. 47, zinc-lead	97	
157	4⅔′	Seventh	10″	4⅔, 2⅔, 1⅔	Sc. 53, zinc-lead	97	
158	3⅗′	Ninth	10″	3⅗, 1⅞, ⅘	Sc. 61, lead	85	
159	2¹⁰⁄₁₁′	Eleventh	10″	2¹⁰⁄₁₁, 1⁵⁄₁₁, ⁸⁄₁₁	Sc. 64, lead	85	
160	16′	Contra Oboe	15″	16, 8, 4, VI	Sc. 4¼″, zinc-lead	85	Organ-tone Oboe
161	16′	Bass Clarinet	15″	16, 8, 4	Sc. 2¾″, zinc-lead	97	Organ-tone Clarinet
162	16′	Vox Humana	15″	16, 8, 4	Sc. 2⅞″, zinc-lead	97	Softer, less assertive than Swell
163		Marimba Harp		8, 4	wood	49 bars	Stroke & reiterating
164		Glockenspiel		4, 2	metal	30 bars	Stroke & reiterating

UNENCLOSED CHOIR *Left Stage Chamber*

165	16′	Quintaton	3¾″	Sc. 48, zinc-lead	73		
166	8′	Diapason	3¾″	8	Sc. 6.5″ (43), zinc-lead	73	Double languid
167	8′	Holz Flute	3¾″	8	Sc. 3½″ x 3½″, wood	73	
168	4′	Octave	3¾″	4	Sc. 57, lead	73	One note smaller than #166
169	2′	Fifteenth	3¾″	2	Sc. 70, lead	73	One note smaller than #168
170	IV	Rausch Quint	3¾″	2⅔, 2 1⅓, 1	Sc. 72, spotted metal	292	

CHOIR Left Forward Chamber, enclosed.

171	16′	Double Dulciana	10″	16, 8, 5⅓	Sc. 38, zinc-lead	92	Quiet, silvery diapason, not stringy
172	8′	Diapason I	10″	8	Sc. 42, zinc-lead	73	Normal diapason tone
173	8′	Diapason II	10″	8	Sc. 45, zinc-lead	73	Somewhat Geigen quality
174	8′	Dulciana Celeste	10″	8	Sc. 50, zinc-lead	73	Like #171
175	4′	Dolce	10″	4, 2⅔, 2, 1⅓, 1	Sc. 64, lead	85	Like #171
176	16′	Melodia	10″	16, 8, 2⅔, 2	Sc. 8″ x 10″, wood	109	Considerable strength of tone
177	8′	Philomela	10″	8	Sc. 6″ x 7⅞″, wood	73	Powerful, normal mouth, Clarabella tone
178	8′	Concert Flute	10″	8	Sc. 4¼″ x 5¼″, wood	73	Orchestral flute
179	8′	Unda Maris	10″	8	Sc. 4¼″ x 5¼″, wood	73	Like #178
308	8′	Nachthorn	10″	8	Sc. 5¾″ (sc. 46), zinc-lead	73	Large-scale, narrow mouth, inverted chimneys, horn-like
180	4′	Spindle Flute	10″	4	Sc. 48, lead	73	Double languid, dominant 4′, well-developed, powerful
181	4′	Flute Overte [*sic*]	10″	4	Sc. 50, lead	73	Non-imitative, like High School
182	2′	Flageolet	10″	2	Sc. 64, lead	73	Bright and somewhat powerful
183	III	Flute Mixture	10″	2, 1⅗, 1⅓	zinc-lead	219	Special Architect design
184	8′	Gemshorn	10″	8	Sc. 50, zinc-lead	73	Part of Sw-Ch chorus, ⅓ dia. at the top
185	8′	Gemshorn Celeste	10″	8	Sc. 50, zinc-lead	73	Like #184
186	8′	Viola Pomposa	10″	8	Sc. 54-50, zinc-lead	73	Broad with power, flared like High School Solo Strings
187	8′	Viola Celeste	10″	8	Sc. 54-50, zinc-lead	73	Like #186
310	8′	Voix Celeste - 2 rks	10″	8	Sc. 60, spotted metal	134	For accompaniment purposes
309	4′	Fugara	10″	4	Sc. 66-62, lead	73	Flared like High School Solo strings
188	16′	Contra Tromba	25″	16, 4	Sc. 8½″, zinc-lead	97	Powerful, smooth, open tuba quality, bright
189	8′	Tromba Real	25″	8	Sc. 6″, zinc-lead	73	Like #188

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190	8′	Brass Cornet	25″	8	Sc. 6″, brass	73	From Gottfried, solo purposes, fortissimo orchestral tone
191	8′	French Horn	10″	8	Sc. 7″, zinc-lead	73	Orchestral, voiced as open French Horn
192	8′	Clarinet	10″	8	Sc. 1¾″, zinc-lead	73	Imitative orchestral quality
193	8′	Bassett Horn	10″	8	Sc. 3⅞″, zinc-lead	73	Imitative
194	8′	Cor Anglais	10″	8	Sc. 4″, metal	73	Resonators stamped “Saxophone”, free reed
195	8′	Kinura	10″	8	Sc. 1⅝″, metal	73	Jazz type, like Steel Pier
196	VI	Acuta	10″	1⅓, 1, ⅘, ⅔, ½, ⅖	Sc. 48, spotted metal	438	Brilliant top for entire ensemble

FANFARE *Left Ceiling Chamber, enclosed with String III. The Fanfare Organ to be so built that it can be enclosed latter if proven desirable. Contains voices of the most assertive character.*

197	*16′*	*Major Flute*	*25″*	*16, 4*	*Sc. 16″ x 20″, wood*	*85*	*Double languid, powerful, non-imitative*
198	*8′*	*Stentor Flute*	*35″*	*8*	*Sc. 10″ s 12″, wood*	*61*	*Double languid, mouths on side, therefore very brilliant*
199	*8′*	*Stentorphone*	*25″*	*8*	*Sc. 40, zinc-lead*	*61*	*Double languid, brilliant diapason tone*
200	*8′*	*Pileata Magna*	*25″*	*8*	*Sc. 8½″ x 10½″, wood*	*61*	*Powerful, covered tone, developed 12th*
201	*4′*	*Flute Octaviante*	*25″*	*4*	*Sc. 46, lead*	*61*	*Double languid, similar to #245, octave to Stentor stops*
202	*2⅔′*	*Recorder Twelfth*	*25″*	*2⅔*	*Sc. 58, lead*	*61*	*Powerful flute*
203	*2′*	*Fife Fifteenth*	*25″*	*2*	*Sc. 2¼″ x 2″, lead, harm.*	*61*	*Double languid, brilliant character, part of flute chorus*
204	*V*	*Cymbal*	*25″*	*1⅓, 1, ⅔, ½, ⅓*	*Sc. 40, lead*	*305*	*Brilliantly voiced*
304	*8′*	*Gamba Tuba*	*25″*	*8*	*Sc. 3½″ x 3½″, wood*	*61*	*Smooth intonation, designed William Van Wart*
305	*8′*	*Gamba Tuba Celeste*	*25″*	*8*	*Sc. 3½″ x 3½″, wood*	*61*	*Like #305, based on Haskell labial Tuba Mirabilis*
306	*4′*	*Gamba Clarion*	*25″*	*4*	*Sc. 2⅝″ x 2⅝″, wood*	*61*	*Like #305*
307	*VI*	*Harmonic Mixture*	*25″*	*1⅗, 1⅕, 1, ⅘, ⅔, ½*	*Sc.42, spotted metal*	*366*	*17th harmonic length, 21st and 23rd tapered*
299	*32′*	*Contra Trombone*	*35″*	*32, 16, 8, 5⅓, 4*	*Sc. 19¼″ x 19¾″, wood, lead*	*97*	*Harmonic, 9½″ square at 16′ C*
205	*16′*	*Contra Posaune*	*50″*	*16, 8, 4*	*Sc. 8″, zinc-lead*	*85*	*Voiced all out, great blaze of tone*
206	*16′*	*Contra Bombardon*	*35″*	*16, 8, 4, 2*	*Sc.11″, zinc-lead*	*97*	*Closed tone of tuba quality*
207	*8′*	*Harmonic Tuba*	*50″*	*8, 4*	*Sc. 7½, zinc-lead*	*73*	*Clear, brilliant tone, originally was to be 100″*
208	*8′*	*Ophicleide*	*50″*	*8*	*Sc. 6½″, zinc-lead*	*61*	*As brilliant as possible, a trumpet of great power*
209	*10⅔′*	*Tromba Quint*	*25″*	*10⅔, 8, 5⅓, 2⅔*	*Sc. 6½″ @ 8′C, zinc-lead*	*85*	*Closed-tone horn*
210	*6⅔′*	*Tromba Tierce*	*25″*	*6⅔, 3⅕, 1⅗*	*Sc. 7″, zinc-lead*	*73*	*Closed-tone horn*
211	*4′*	*Major Clarion*	*50″*	*4*	*Sc. 6″, zinc-lead*	*61*	*Octave of reed chorus, voiced on the brilliant side*
212	*VII*	*Stentor Mixture*	*35″*	*8, 5⅓, 4, 2⅔, 2, 1⅓, 1*	*Sc. 41, lead*	*427*	*Double languid, brilliant diapason tone*
212a	*8′*	*Stentor Diapason*	*35″*	*8*	*from St Mix VI*		
212b	*4′*	*Stentor Octave*	*35″*	*4*	*from St Mix VI*		

ECHO *Right Ceiling Chamber, enclosed.*

298	*32′*	*Violone*	*25″*	*32, 16, 8, 4*	*Sc. 9¼″ x 9¼″, wood, spotted metal*	*97*	*Double languid*
319	*8′*	*Violone Celeste*	*25″*	*8*	*Sc. 50, spotted metal*	*56*	*Double languid, like #298*
213	*16′*	*Gamba*	*15″*	*16, 8, 4*	*Sc. 52, spotted metal*	*85*	*Broad, voiced for considerable body*

214	*16′*	*Spire Flute*	*15″*	*16, 8, 4, 2⅔, 2, 1⅓, 1*	*Sc. 40-44, zinc-lead*	*109*	*Double for Spitz Flute chorus*
215	*8′*	*Diapason*	*15″*	*8*	*Sc. 44, zinc-lead*	*61*	*Mellow, silvery, like antique English diapason*
216	*8′*	*Spitz Flute*	*15″*	*8*	*Sc. 50, zinc-lead*	*61*	*Characteristic tone*
217	*8′*	*Flute Celeste I*	*15″*	*8*	*Sc. 50, zinc-lead*	*61*	*Like #216*
218	*8′*	*Flute Celeste II (t.c.)*	*15″*	*8, 3⅕, 1⅗*	*Sc. 50, zinc-lead*	*77*	*Tuned flat*
219	*8′*	*Waldhorn*	*15″*	*8*	*Sc. 48, zinc-lead*	*61*	*Introduced by Architect at St. Mark's*
220	*16′*	*Clarabella*	*15″*	*16, 10⅔, 8, 4, 2⅔, 2*	*Sc. 4¾″ x 6″, wood*	*97*	*Non-imitative tone, 4¾″ x 6″ at 8′-C*
221	*8′*	*Tibia Mollis*	*15″*	*8*	*Sc. 39, zinc-lead*	*61*	*Leathered lip, extremely narrow mouth, stoppers replaced with caps*
222	*8′*	*Flute Sylvestre*	*15″*	*8*	*Sc. 52, zinc-lead*	*61*	*Spitzflute with greater harmonic development*
223	*8′*	*Flute Celeste*	*15″*	*8*	*Sc. 52, zinc-lead*	*61*	*Like #222*
224	*4′*	*Rohr Flute*	*15″*	*4*	*Sc. 48, spotted metal*	*61*	*Full, liquid character*
225	*VI*	*Mixture Aetheria*	*15″*	*2, 1⅗, 1⅓, 1, ⅔, ½*	*spotted metal*	*366*	*Silvery, Dulciana pipes*
226	*16′*	*Bassoon*	*15″*	*16, 8, 4*	*Sc. 3¾″, Papier-Mâché*	*85*	*Orchestral tone*
227	*16′*	*Clarinet*	*15″*	*16, 8, 4*	*Sc. 2½″ x 3½″, zinc-lead*	*85*	*Somewhat thin-scaled quality*
228	*8′*	*Trumpet Minor*	*15″*	*8*	*Sc. 3½″, zinc-lead*	*61*	*More harmonic development than Cornopean*
229	*8′*	*Cor d'Amour*	*15″*	*8*	*Sc. 5″, zinc-lead*	*61*	*Orchestral, closed "hand"-tone French Horn*
303	*8′*	*Vox Humana I*	*15″*	*8*	*Sc. 3⅞″, zinc-lead*	*61*	*Extra large*
230	*16′*	*Vox Humana II*	*15″*	*16, 8, 4*	*Sc. 3¾″, zinc-lead*	*85*	*Subject of further direction by Architect*
231	*16′*	*Tuba d'Amour*	*25″*	*16, 8, 4*	*8″ x 8″, wood*	*85*	*Smooth, considerable power to dominate division*
232		*Chimes*		*8*	*metal tubes*	*25*	*Softer than Great-Solo Chimes*

GALLERY I *Right Center Chamber Unenclosed*

All Gallery Organs can be coupled individually or together to any division and are intended to produce the necessary body of tone in the center of the Hall. All registers voiced to produce the greatest possible volume to overcome the handicap of great distance. "The Builder is required to produce a Diapason chorus more powerful than any heretofore produced in an organ. With the approval of the Architect, the Builder may change the scales and treatments which the Architect has specified based on past experience; for the Builder will be held responsible for the result".

233	*16′*	*Diaphone*	*25″*	*16, 8*	*Sc. 14¼″, x ¼″, wood, zinc-lead*	*85*	*Voiced on reedy side, greatest possible fundamental tone*
318	*VII*	*Mixture Mirabilis*	*25″*	*8, 5⅓, 4, 2⅔, 2, 1⅓, 1*	*zinc-lead*	*511*	*Double languid*
318(a)	*8′*	*Diapason*	*25″*	*8*	*from Mix VII*		*Double languid*
318(b)	*4′*	*Octave*	*25″*	*4*	*from Mix VII*		*Double languid*
234	8′	Tuba Maxima	100″	8, 4	Sc. 6″, zinc-lead	73	Pocket shallots, voiced for greatest possible quantity of tuba tone, by Henry Willis.
235	16′	Trumpet Mirabilis	100″	16, 8, 4	Sc. 5½″, zinc-lead	85	Fiery trumpet, a veritable blaze of tone will be required

GALLERY II *Right Center Chamber, enclosed.*

242	*16′*	*Flauto Maggiore*	*25″*	*16, 4*	*Sc. 11″ x 14″, wood*	*97*	*Double languid, powerful fundamental tone*
243	*8′*	*Jubal Flute*	*25″*	*8*	*Sc. 7″ x 9½″, wood*	*73*	*Solo voice, clear, exaggerated orchestral quality*
244	*8′*	*Harmonic Flute*	*25″*	*8*	*Sc. 42, zinc-lead*	*73*	*Double languid, treated like a French Flute harmonique*
245	*4′*	*Harmonic Flute*	*25″*	*4*	*Sc. 54, lead*	*73*	*Double languid, like #243*
246	*2⅔′*	*Harmonic Twelfth*	*25″*	*2⅔*	*Sc. 62, lead*	*61*	*To help form an harmonic structure of brilliant character*
247	*2′*	*Harmonic Piccolo*	*25″*	*2*	*Sc. 68, lead*	*61*	*Double languid, voiced as top of flute chorus*
248	*III*	*Harmonic Mixture*	*25″*	*1⅗, 1⅓, 1*	*lead*	*183*	*To help form an harmonic structure of brilliant character*

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GALLERY III *Left Center Chamber, unenclosed.*

236	*16′*	*Contra Diapason*	*20″*	*16, 4*	*Sc. 10″ x 12¼″, zinc-lead*	*97*	*Double languid, Schulze voicing, very powerful, well-developed harmonically*
237	*8′*	*Diapason I*	*20″*	*8*	*Sc. 37-33, zinc-lead*	*73*	*Double languid, Schulze type, smooth, powerful, some development*
238	*8′*	*Diapason II*	*20″*	*8*	*Sc. 40-36, zinc-lead*	*73*	*Double languid, Schulze-type, brighter than I, Geigen quality*
239	*4′*	*Octave*	*20″*	*4*	*Sc. 47-43, lead*	*73*	*Double languid, Schulze-type, bright, as powerful as possible*
240	*2′*	*Fifteenth*	*20″*	*2*	*Sc. 57-53, lead*	*73*	*Double languid, Schulze-type, to balance Octave 4′*
241	*IV*	*Mixture*	*20″*	*2⅔, 1, 1⅓, 1*	*spotted metal*	*292*	*Schulze-type, top of whole chorus, sufficiently powerful to cope*

GALLERY IV *Left Center Chamber, enclosed.*

249	*16′*	*Saxaphone*	*25″*	*16, 8, 4*	*Sc. 5½″, brass with copper bells*	*85*	*Gottfried, orchestral, imitative of orchestral Saxophone 4″ at 8′C*
250	*8′*	*Major Oboe*	*25″*	*8*	*Sc. 3⅛″, zinc-lead*	*73*	*Organ-type Oboe tone*
251	*8′*	*Musette Mirabilis*	*25″*	*8*	*Sc. 1⅞″, zinc-lead*	*73*	*Of the type developed by Anton Gottfried*
252	*8′*	*Cor d'Orchestre*	*25″*	*8*	*Sc. 5″, zinc-metal*	*73*	*Gottfried, "open" tone of orchestral French Horn*
253	*8′*	*Major Clarinet*	*25″*	*8*	*Sc. 4″, zinc-lead*	*73*	*Orchestral, imitative of orchestral Clarinet*
300	*8′*	*Brass Trumpet*	*25″*	*8*	*Sc. 5½″, brass*	*73*	*Gottfried, harmonic*
301	*8′*	*Euphone*	*25″*	*8*	*Sc. 5″, zinc-metal*	*73*	*Gottfried*
302	*8′*	*Egyptian Horn*	*25″*	*8*	*Sc. 5″, brass with copper bells*	*73*	*Gottfried,* "Egyptian Bazu" *on early console incarnation*

STRING I *Left Stage Chamber, enclosed. The most powerful of the String organs, all pipes flared outward four notes.*

254	16′	Contra Basso	25″	16, 4	Sc. 44-40, zinc-spotted metal	97	Double languid, very powerful with the bite of a Contra Bass
255	8′	Cello	25″	8	Sc. 50-46, zinc-lead	73	Double languid, powerful, imitative, rather broad
256	8′	Cello Celeste I - 2 rks	25″	8	Sc. 53, zinc-lead	146	Double languid, a broader quality of Cello tone
257	8′	Cello Celeste II - 2 rks	25″	8	Sc. 55-51, zinc-spotted metal	134	More keen than Celeste I, celeste rank t.c.
258	8′	Violins I - 2 rks	25″	8	Sc. 64-60, zinc-spotted metal	146	As imitative as possible of the orchestral Violin
259	8′	Violins II - 2 rks	25″	8	Sc. 72-68, zinc-spotted metal	134	As imitative as possible of the orchestral Violin, celeste t.c.
260	8′	Violins III - 2 rks	25″	8	Sc. 70-66, zinc-spotted metal	146	As imitative as possible of the orchestral Violin
261	8′	Violins IV - 2 rks	25″	8	Sc. 74-70, zinc-spotted metal	134	As imitative as possible of the orchestral Violin, celeste t.c.
262	8′	Violins Secundo I - 2 rks.	25″	8	Sc. 60-56, zinc-spotted metal	146	More broad and less imitative than Violins, give more body to ensemble
263	8′	Violins Secundo II - 2 rks.	25″	8	Sc. 62-58, zinc-spotted metal	134	More broad and less imitative than Violins, celeste t.c.
264	4′	Violins Secundo - 2 rks.	25″	8	Sc. 68-64, spotted metal	146	Voiced as the powerful octave to the chorus

STRING II *Right Forward Chamber, enclosed. The largest and most important String organ, to imitate true string tone to the utmost ability of the voicer.*

265	*16′*	*Double Bass*	*15″*	*16, 4*	*Sc. 40, zinc-lead*	*97*	*To yield the most powerful string tone possible from a metal pipe*
266	*16′*	*Contra Bass*	*15″*	*16, 4*	*Sc. 5″ x 5″, wood*	*97*	*To contain a woody quality, softer than Double Bass 16′*

267	*16'*	*Contra Viol*	*15"*	*16, 4*	*Sc. 50, zinc-spotted metal*	*97*	*Keen, the double to the Violins*
268	*8'*	*Viola Diapason*	*15"*	*8*	*Sc. 48, zinc-lead*	*73*	*The foundation voice of the division*
269	*8'*	*Violin Cello*	*15"*	*8*	*Sc. 2¾" x 4", wood*	*73*	*A keen wood string*
270	*8'*	*Cello Phonon*	*15"*	*8*	*Sc. 52, zinc-spotted metal*	*73*	*Double languid, a powerful metal string, on the keen side*
271	*8'*	*Cello*	*15"*	*8*	*Sc. 58, zinc-spotted metal*	*73*	*Double languid, imitative Cello quality*
272	*8'*	*Cello Celeste*	*15"*	*8*	*Sc. 58, zinc-spotted metal*	*146*	*Double languid, like #271, tuned flat-sharp*
273	*8'*	*Viola Phonon*	*15"*	*8*	*Sc. 55, zinc-spotted metal*	*73*	*Double languid, characteristic Viola tone, with Celeste to hold its own in String choir*
274	*8'*	*Viola Celeste - 2 rks.*	*15"*	*8*	*Sc. 60, zinc-spotted metal*	*134*	*Double languid, celeste t.c., tuned flat/sharp*
275	*8'*	*Violin Phonon*	*15"*	*8*	*Sc. 60, zinc-spotted metal*	*73*	*Double languid*
276	*8'*	*Violin*	*15"*	*8*	*Sc. 62, zinc-tin*	*73*	*Very keen and assertive but with considerable body of tone*
277	*8'*	*Viol Celeste I - 2 rk.s*	*15"*	*8*	*Sc. 62, zinc-spotted metal*	*146*	*As imitative as possible in an organ pipe, tuned sharp*
278	*8'*	*Viol Celeste II - 2 rk.s*	*15"*	*8*	*Sc. 66, zinc-tin*	*134*	*As imitative as possible, tuned sharp*
279	*8'*	*Viol Celeste III - 2 rks.*	*15"*	*8'*	*Sc. 72, zinc-spotted metal*	*134*	*Double languid, as imitative as possible, tuned flat*
280	*8'*	*Viol Celeste IV - 2 rk.s*	*15"*	*8*	*Sc. 67, zinc-spotted metal*	*134*	*As imitative as possible, tuned sharp*
281	*8'*	*Viol Celeste V - 2 rk.s*	*15"*	*8*	*Sc. 67, zinc-tin*	*134*	*As imitative as possible, tuned flat*
282	*4'*	*Violin - 2 rks*	*15"*	*4*	*Sc. 68, spotted metal*	*146*	*A powerful octave to the Violin choir*
283	*4'*	*Violas - 2 rks*	*15"*	*4*	*Sc. 68, spotted metal*	*146*	*A powerful octave to the Viola choir*
284	*4'*	*Viol Principal*	*15"*	*4*	*Sc. 58, lead*	*73*	*A milder quality of string tone*
285	*V*	*String Mixture*	*15"*	*3⅕, 2, 1⅗, 1⅓, 1*	*Sc. 68, spotted metal*	*305*	*Sufficient assertiveness to tell in the string ensemble*
286	*8'*	*Tromba d'Amour 8*	*15"*	*8*	*Sc. 5", zinc-lead*	*73*	*Orchestral Oboe type, add life to the chorus*
287	*5⅓'*	*Quint Flute*	*15"*	*5⅓, 4, 2*	*Sc. 3¾"x 3", stopped wood*	*78*	*non-imitative stopped flute for timbre creation*
288	*2⅔'*	*Flute Twelfth*	*15"*	*2⅔*	*Sc. 2½' x 3½', stopped wood*	*73*	*non-imitative stopped flute for timbre creation*

STRING III *Left Ceiling Chamber, enclosed with Fanfare. The softest of the String organs, to imitate muted string effects.*

289	*8'*	*Cello Celeste I - 2 rks.*	*15"*	*8*	*Sc. 3⅜" x 3⅜", zinc-tin*	*146*	*Imitative quality of the 'G' string; flat face, sharp*
290	*8'*	*Cello Celeste II - 2 rks.*	*15"*	*8*	*Sc. 58, zinc-spotted metal*	*146*	*Imitative quality of the 'G' string, flat*
291	*8'*	*Cello Celeste III - 2 rks.*	*15"*	*8*	*Sc. 62, zinc-spotted metal*	*146*	*Broader than the Cello ranks, sharp*
292	*8'*	*Viol Celeste I - 2 rk.s*	*15"*	*8*	*Sc. 56, zinc-lead*	*146*	*Keenly voiced with flat faces, tuned flat*
293	*8'*	*Viol Celeste II - 2 rks.*	*15"*	*8*	*Sc. 1¹¼₈", zinc-tin*	*134*	*Keenly voiced, extremely thin scale, celeste t.c., sharp*
294	*8'*	*Viol Celeste III - 2 rks.*	*15"*	*8*	*Sc. 66", zinc-spotted metal*	*146*	*Keenly voiced, flat*
295	*8'*	*Viol Celeste IV - 2 rks.*	*15"*	*8*	*Sc. 1" x 1", 1¹⁵⁄₁₆" @ t.c., wood/tin*	*134*	*Keenly voiced, slim tapered pipes, sharp*
296	*8'*	*Viol Celeste V - 2 rks.*	*15"*	*8*	*Sc. 64, zinc-tin*	*146*	*sharp, tapered*
297	*8'*	*Cor Anglais*	*15"*	*8*	*Sc. 4½", zinc-lead*	*73*	*Orchestral*

PERCUSSIONS *Traps unenclosed in right stage chamber.*

A.	*Grand Piano 16, 8, 4 Chickering Grand Piano*	*I.*	*Chinese Gong*
B.	*Contra Bass Brum*	*J.*	*Persian Cymbal*
C.	*Bass Drum*	*K.*	*Persian Cymbal*
D.	*Bass Drum*	*L.*	*Tambours*
E.	*Snare Drum*	*M.*	*Castanets*
F.	*Snare Drum*	*N.*	*Triangle*
G.	*Snare Drum*	*O.*	*Wood Block*
H.	*Cymbal (metal hammers)*	*P.*	*Tom Tom*
		—	*Gong - Single chime tube note A*

Note: Richards noted in the second revision of the bid specifications in 1929, "that exaggerated voicing will be required to produce the characteristic voice implied by each register, in so large an auditorium.

Without such exaggeration, the great organ could be a monotonous, colorless affair that will make no appeal to the type of audience likely to frequent the Hall".

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Mixture Compositions: as stated in the contract, has not been verified for accuracy as built.

Great Sesquialtera Major VI

C	3⅕	2	1⅗	1⅓	1
f♯⁰	4	3⅕	2	1⅗	1⅓
c♯²	5⅓	4	3⅕	2	1⅗
f³	8	5⅓	4	3⅕	2

Great Schulze Mixture V

C	2	1⅓	1	⅔	½
g⁰	4	2⅔	2	1⅓	1
c²	8	5⅓	4	2⅔	2

Great Fourniture V-VI

C	1	⅔	½	⅓	¼	
c⁰	1⅓	1	⅔	½	⅓	
c¹	2	1⅗	1⅓	1	⅔	½
c²	2⅔	2	1⅗	1⅓	1	⅔
c³	4	2⅔	2	1⅗	1⅓	1
c⁴	5⅓	4	2⅔	2	1⅗	1⅓

Swell Fourniture V

C	2⅔	2	1⅓	1	⅔
e⁰	5⅓	4	2⅔	2	1⅓
c²	8	5⅓	4	2⅔	2
e³	16	10⅔	8	5⅓	4

Swell Plein Jeu VII

C	2	1⅓	1	⅔	½	⅓	¼
c°	2⅔	2	1⅓	1	⅔	½	⅓
c¹	4	2⅔	2	1⅓	1	⅔	½
c²	5⅓	4	2⅔	2	1⅓	1	1
c³	8	5⅓	4	2⅔	2	2	2
c⁴	10⅔	8	5⅓	4	4	4	4

Swell Cymbal VIII

C	2⅔	2	1⅗	1⅓	1⅐	1	⅘	⅔
c♯²	2⅔	2	1⅗	1⅓	1⅓	1⅐	1	⅘
c♯³	2⅔	2⅔	2⅐	2	2	1⅐	1⅗	1⅓
c♯⁴	5⅓	4⅐	4	4	3⅗	3⅕	2⅔	2⅔
c♯⁵	10⅔	9⅐	8	8	7⅕	6⅖	5⅓	5⅓

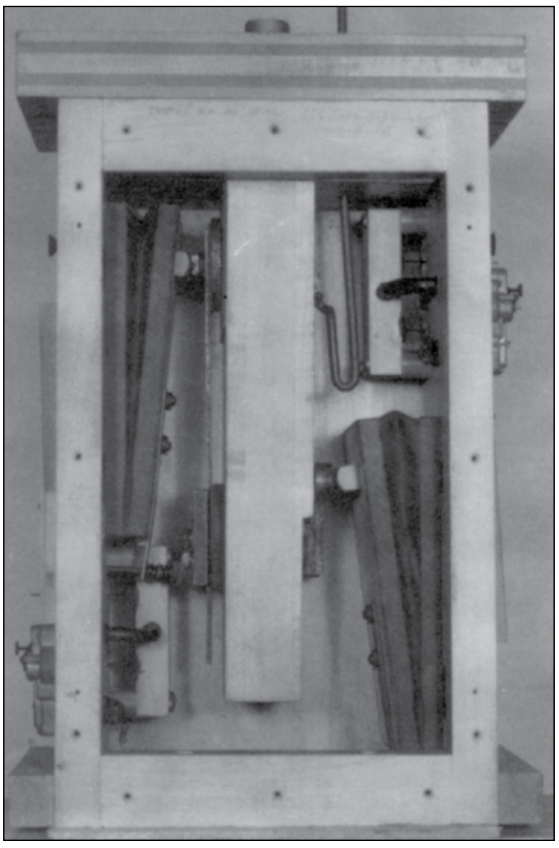
Rank 1: Smooth diapason
Rank 2: Bright harmonic flute
Rank 3: Spitz flute, 2:3 taper
Rank 4: Smooth diapason
Rank 5: Gemshorn, 2:3 taper
Rank 6: Diapason, outward flare by 4 notes
Rank 7: Gemshorn, 2:3 taper
Rank 8: Flutey diapason

Choir Acuta VI

C	1⅓	1	⅘	⅔	½	⅖
g♯²	2	1⅗	1⅓	1	⅘	⅔
c♯³	2⅔	2	1⅗	1⅓	1	⅘

Fanfare Harmonic Mixture VI

C	1⅗	1⅐	1	⅘	⅔	½
g⁰	2	1⅗	1⅐	2	⅘	⅔
c♯²	2⅔	2	1⅗	1⅐	1	⅘



The 64′ dual shallot. Note on the left side the beater and starter for the *Diaphone* and on the right side, the weighted tongue and starter for the *Dulzian*, both sharing the same resonator. Unable to operate simultaneously, pneumatics keep one apparatus closed while the other is sounding.

ESSAY I BY **SCOT HUNTINGTON**

The Harmonic Series for Organbuilders

THE HARMONIC SERIES CODIFIES THE ANALYSIS OF TONE INTO its sonic components. A **partial** is any single sine-wave frequency making up a larger complex waveform, for instance, one of the many frequencies making up the complex sound of a single trumpet note. An **overtone** is any partial that is a component of a complex tone, and can be *harmonic*, i.e., part of the natural harmonic series, or *inharmonic*, a partial not related mathematically to the fundamental and which might be interpreted as noise. **Harmonic** refers to a frequency that is a numeric multiple of the fundamental, and by definition is also a partial: e.g., for a fundamental pitch of A100 Hz, the Octave or second harmonic is multiplied by two equaling 200 Hz, and the 10th harmonic is ten times the fundamental or 1000 Hz, etc. Debate continues among some acousticians whether the fundamental is a harmonic at all, and therefore whether it is harmonic (or partial) No.1, and the octave is No. 2, or conversely, whether the octave is considered the "first" harmonic, and the partial numbers thereafter alter accordingly. For the purposes of this table, the fundamental is considered the first partial/harmonic. The **Harmonic** column represents the naturally occurring order of a given tone's partial structure beginning with the fundamental and progressing upwards and is numbered from one to beyond the range of human hearing. The **Interval** column is intended to convey clarity to the organbuilder by representing the equivalent in musical terms (or mutation stop name) and is based on a 12-note octave. This is also useful for interpreting Mixture compositions documented in harmonic notation. **Tempered Pitch** gives the equal-tempered note on the C-compass organ keyboard closest to the true pitch of the partial. The **Relationship to Prime** is the mathematical proportion of a partial for a given fundamental pitch. This is useful for determining the mutation series for a specific organ pitch, e.g., producing aliquot stops such as 64′ and 32′ Cornets. To find the fifth partial of the 32′ series for instance, (an equation more easily grasped as a fraction), the base pitch [32] is divided by the desired partial number [5] and then reduced to the lowest common denominator: e.g., 32/5 = 6 2/5. The second **Interval** table simply establishes an organ pitch basis for musical intervals below the harmonic series.

HARMONIC & INTERVAL		APPROXIMATE TEMPERED PITCH @ 8′	RELATIONSHIP TO PRIME	32′ SERIES	16′ SERIES	8′ SERIES	64′ SERIES
1.	Prime	C	divided by 1	32	16	8	64
2.	Octave	c^0	divided by 2	16	8	4	32
3.	Twelfth	g^0	divided by 3	10 2/3	5 1/3	2 2/3	21 1/3
4.	Fifteenth	c^1	divided by 4	8	4	2	16
5.	Seventeenth	e^1	divided by 5	6 2/5	3 1/5	1 3/5	12 4/5
6.	Nineteenth	g^1	divided by 6	5 1/3	2 2/3	1 1/3	10 2/3
7.	Flat 21st	$b^{\flat 1}$	divided by 7	4 4/7	2 2/7	1 1/7	9 1/7
8.	22nd	c^2	divided by 8	4	2	1	8
9.	23rd	d^2	divided by 9	3 5/9	1 7/9	8/9	7 1/9
10.	24th	e^2	divided by 10	3 1/5	1 3/5	4/5	6 2/5
11.	25th	$f/f^{\sharp 2}$	divided by 11	2 10/11	1 5/11	8/11	5 9/11
12.	26th	g^2	divided by 12	2 2/3	1 1/3	2/3	5 1/3
13.	27th	a^2	divided by 13	2 6/13	1 3/13	8/13	4 12/13
14.	Flat 28th	$b^{\flat 2}$	divided by 14	2 2/7	1 1/7	4/7	4 4/7
15.	28th	b^2	divided by 15	2 2/15	1 1/15	8/15	4 4/15
16.	29th	c^3	divided by 16	2	1	1/2	4
20.	31st	e^3	divided by 20	1 3/5	4/5	2/5	3 1/5
24.	33rd	g^3	divided by 24	1 1/3	2/3	1/3	2 2/3
32.	36th	c^4	divided by 32	1	1/2	1/4	2
40.	38th	e^4	divided by 40	4/5	2/5	1/5	1 3/5
48.	40th	g^4	divided by 48	2/3	1/3	1/6	1 1/3
64.	43rd	c^5	divided by 64	1/2	1/4	1/8	1
INTERVAL							
Third		E		25 3/5	12 4/5	6 2/5	51 1/5
Fifth		G		21 1/3	10 2/3	5 1/3	43 1/3
Seventh		$B^{\flat}$		18 2/7	9 1/7	4 4/7	36 4/7
Ninth		d^0		14 2/9	7 1/9	3 5/9	28 8/9
Tenth		e^0		12 4/5	6 2/5	3 1/5	25 3/5
Eleventh		f^0		11 7/11	5 9/11	2 10/11	23 3/11
Flat Fourteenth		$b^{\flat 0}$		9 1/7	4 4/7	2 2/7	18 2/7

ESSAY II BY **NATHAN BRYSON**

History of the Convention Hall Midmer-Losh

IN NOVEMBER 1923, MAYOR EDWARD L. BADER INITIATED A public referendum at which time residents approved the construction of a monumental convention hall. Construction began in August 1926, and the building was officially opened in June 1929. At the time of its construction, the building was the world's largest auditorium and covered seven acres. The arena, where the Midmer-Losh organ is located, measures 487 feet long, 288 feet wide, and 137 feet high. The barrel-shaped ceiling is supported by the building's walls rather than pillars, granting an unobstructed view from one end of the room to the other. In its original configuration, the building was a multi-purpose room that could serve as a convention hall, sports arena, and concert venue. Fixed seating in balconies ran along three of the walls, but the bulk of the seating was in bleachers or moveable chairs on the main floor. At maximum capacity, the arena could hold more than 40,000 people. Following a $90 million renovation in 1999, the capacity of the arena was reduced to just over 14,000 but with greatly improved sight lines, better access, and amenities.

One of the key players responsible for the creation of the mammoth organ was a New Jersey state senator by the name of Emerson Lewis Richards. A lawyer and politician by profession, Richards was enthralled by pipe organs from an early age. He was well-traveled, spending a great deal of time in Europe studying historical instruments, and was well acquainted with many of the finest organbuilders and organists of the time. His family's wealth enabled him to install numerous pipe organs in his palatial home, located only ten blocks from Convention Hall. His house instruments were a laboratory for testing new pipework, and he was notorious for swapping ranks of pipes with some frequency. One of the largest of his residence instruments, Aeolian-Skinner Organ No. 1047 (four manuals, 146 ranks), was built for the Senator in 1944 and moved a few years later in 1948 to First Baptist Church of Denver, Colorado, where it is still extant, slightly altered. His vision of the "perfect" pipe organ morphed considerably throughout his life, and his contributions to organbuilding cannot be overstated.

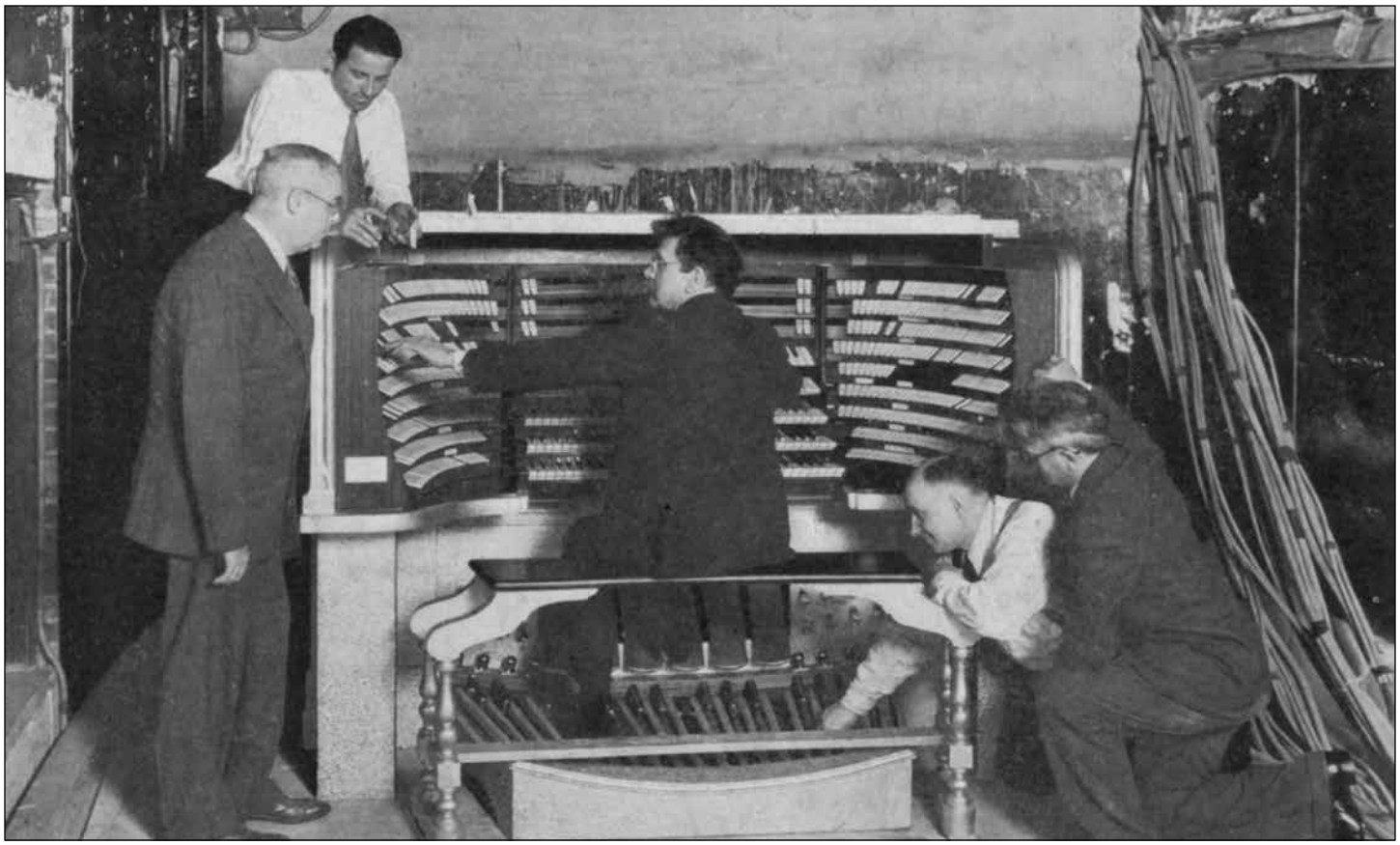
It was Richards who was the champion and mastermind behind the installation of a pipe organ in the Convention Hall. While a pipe organ would not have been uncommon in a civic building of the time, the Senator used his influence to convince city officials that it would be more cost effective to spend a large sum of money up front to build an organ and then only require one musician to play it, rather than to hire a large orchestra or band every time there was a need for live music. The size of the instrument would have to be monumental to fill the space and lead 40,000 people in song.

Richards' initial design called for an astonishing 592 ranks and 43,641 pipes. Space and budget constraints mercifully intervened, and the revised scheme was reduced to 403 ranks and 29,646 pipes. By the time construction was complete, the instrument grew to its present 449 ranks and 33,112 pipes. The twenty divisions of the organ are located in eight chambers at the front and sides of the room. W.W. Kimball, M.P. Möller, and Midmer-Losh were asked to submit proposals based on the Senator's specifications. Kimball's price was the highest at $467,617. Möller came in lower at $418,850, and the lowest bid of $347,200 came from Midmer-Losh. All of the bids were still over the $300,000 budget established by the city, but Richards pointed out that if the instrument was to fit the budget exactly, it would have to be smaller than what was, at the time, the world's largest organ–the Wanamaker organ in nearby Philadelphia. The fact that the city provided the extra money suggests that perhaps having "an organ of record-breaking size" was indeed part of their civic pride. Ultimately, Richards was able to insert a clause into the contract, surprisingly accepted by the builder, which gave him the power as the Organ Architect, to make any change to the contract at any time with the builder bearing the cost. Richards invoked the clause on numerous occasions with devastating financial results for the Midmer-Losh company.

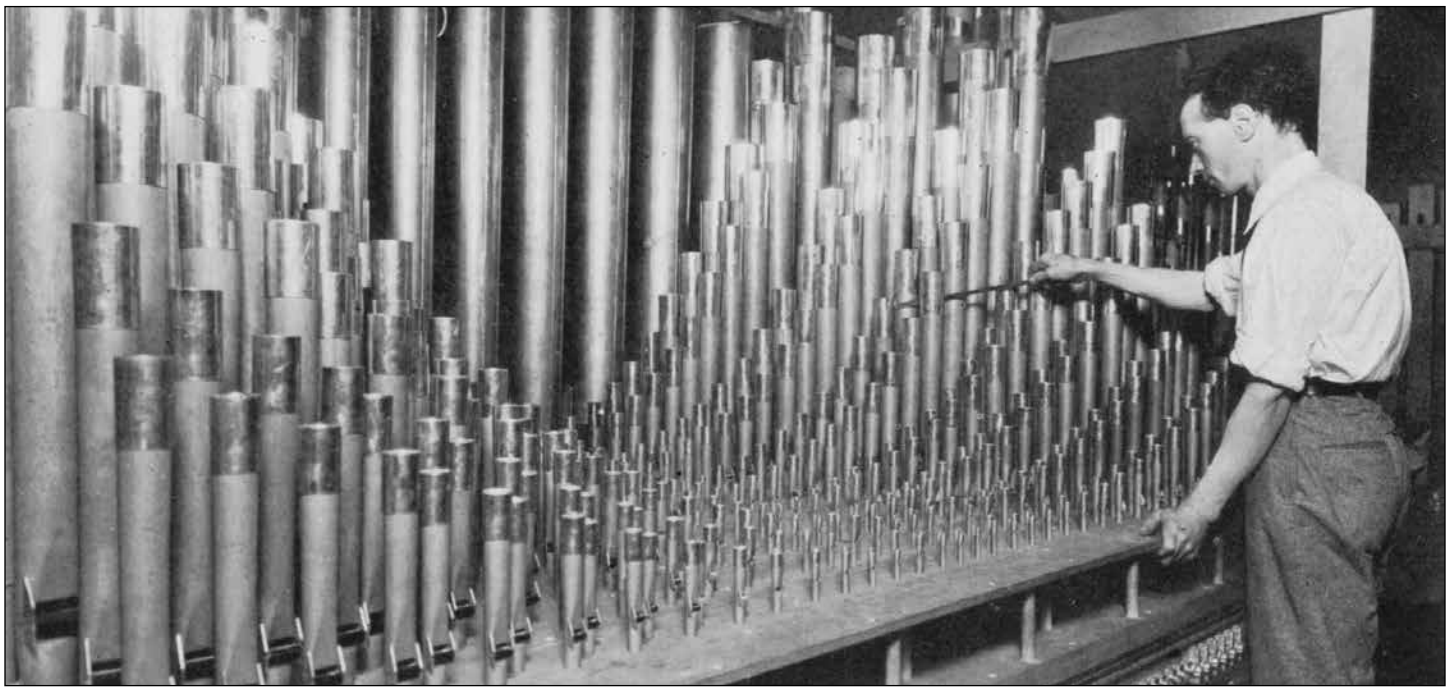
Construction of the organ, Midmer-Losh Opus 5550, began in May 1929 and was completed in December 1932. The first two divisions made playable were the Brass Chorus and String II on July 28, 1929. They were played from a repurposed three-manual Möller theatre organ console. As construction progressed, the instrument was played from the five-manual "portable" console until the seven-manual console was completed. James Winter, an electrician for Midmer-Losh, gave the first public recital on May 11, 1932, during the Atlantic City Fair.

The contract for the organ was signed only a few months before the Great Depression began, but the money for the organ was not affected and construction continued. In fact, in some ways, the Great Depression may have contributed to the success of the instrument. While other organbuilding firms were downsizing or ceasing operations altogether, there was plentiful work in Atlantic City and many of the best and brightest minds in organbuilding were associated with the project. Former employees of Estey, Steere, Odell, Marr & Colton, Dennison, Gottfried, and Wurlitzer who found themselves suddenly looking for work, all found their way to Atlantic City. Their contributions can be seen and heard throughout the instrument. In the end, however, the project was not exempt from the financial struggles of the Depression, which led to increasingly bitter conflicts between the Midmer-Losh company and Atlantic City as the instrument edged toward completion.

The instrument's contentious completion was an ominous foreshadowing of its future. Following the official completion of the organ, formally accepted on December 5, 1932, the Midmer-Losh



The portable console with 500 registers controls the instrument as a straight organ. The city organist, Arthur Scott Brook seated at the console with Emerson Richards far left and organbuilder Seibert Losh kneeling far right. CREDIT: *Under the Sassafrass Tree,* Midmer-Losh, 1930



H. Vincent Willis tuning the 7-rank double-languid Stentor Mixture on 35″ pressure made with double languids and flared 4 notes wider at the top than at the mouth and by far the most powerful and brilliant Mixture ever made. CREDIT: *Under the Sassafrass Tree,* Midmer-Losh, 1930

The Right Stage chamber key relay room. This relay is still in use today.
PHOTO: Fred Hess and Son

company was required to keep two men at the job for one year, to carry out maintenance and, in effect, continue the tonal regulation that would have otherwise been completed during the contractual construction period. One of the men tasked with this assignment was Roscoe Evans, who would remain in Atlantic City as the organ's first curator. His greatest challenge was the combination action for the seven-manual console. The complex machinery to control 1,235 stop tabs and 240 pistons was located in two rooms in the basement below the stage. The combination of delicate metal traces and machinery contained in wooden boxes proved a disastrous pairing, especially with a steam line running through one of the rooms! The combination action was so troublesome that it was decommissioned after only two years. The great Atlantic hurricane that struck the island in 1944 inundated the basement levels of the hall with 15 million gallons of seawater, permanently damaging the combination action and requiring extensive repair to the blowers and their motors.

Evans retired in the early 1950s, and his successor was William Rosser. Rosser continued the daunting effort of single-handedly trying to keep the largest pipe organ in the world playing on shoestring budget. The organ was used for the 1964 Democratic National Convention which nominated Lyndon Johnson, but by that time the instrument was already exhibiting major problems. By 1962, the Gallery I reeds were out of commission, and portions of the instrument were becoming unreliable or failing altogether. While there is considerable documentation from Evans's tenure, there are no records from Rosser's time. A stipulation for holding the 1964 convention in Atlantic City was the installation of air conditioning. While no doubt enjoyed by convention attendees and many others in the following years, leaks from condensate pans caused significant on-going problems and the instrument's decline accelerated as a result.

Dennis McGurk joined Rosser as his assistant in 1959. While he had no background in organbuilding, he was a quick learner and in 1984 succeeded Rosser as the third Curator of Organs. McGurk recalled, "Pretty much all of the organ was working when I arrived in 1959. Since that time, however, it has slowly but surely gone downhill. Roof leaks in the '70s caused most of the damage in the two upper chambers, and the simple fact of the matter is that the authorities had little interest in spending money on repairs at a time when the City as a whole was in decline." McGurk had the unenviable and discouraging task of keeping as much of the organ playable as possible, with a limited budget and materials. Perhaps his greatest contribution was keeping at bay those who wanted to simply discard the instrument, thus preserving it for future restoration. McGurk retired at the end of 1998. Prior to his retirement, the *Atlantic City Convention Hall Organ Society* was formed to raise awareness of the instrument and begin the process of fundraising for its restoration. This group was instrumental in protecting the instrument during the 1998 building renovation and furthering McGurk's advocation that the instrument be saved and not relegated to the scrap pile.

Senator Emerson Richards showing the ergonomic design of the console where the player could easily reach the extremes of key and tab placement.
PHOTO: Fred Hess and Son

ADRIAN PHILLIPS THEATER

JIM WHELAN BOARDWALK HALL

Adrian Phillips Theater
Atlantic City, New Jersey

W.W. KIMBALL

Chicago, Illinois
K.P.O. 7073, 1930

THIS STOPLIST DOCUMENTS WHAT APPEARS TO THE PLAYER SEATED at the console. The stop keys on this console do not have the typical "quick read" capital letter abbreviations found at the tip of standard theatre organ stop keys. Instead, the stop information includes the name (or its abbreviation), pitch and foot mark, a number indicating the rank source from a master chamber resource list, and L or R to indicate the appropriate chamber. The couplers have black keys with white engraving, the reeds are red, mixtures and celestes marbled yellow, and remaining stops are white, all with black engraving. The second-touch and accessory stops are on the backrail. In the specification below, most stop names are clear regarding the parent rank, and those with a different name are annotated as to their source. The 2019 stoplist additions are activated by on-off piston controls in a concealed drawer. The stops in *italics* are the straight ranks on pitman chests and are only available on a single home manual. The 2019 *Pedal Divide* allows for a selectable dividing point, the bass draws from the Pedal stops and the treble plays through any manual to pedal coupler.

Pitch	Stop	Rank	Side	Explanatory Notes
PEDAL				**Pedal Division Plate**
32′	Diaph. Result.	3	L	C: Diaph. 16′+10⅔′; 32′@c⁰
32′	Acou. Bass	7	L	C: 16′ Tibia+10⅔′ Bour.; 32′@ c⁰
32′	Bombarde	1	R	Tuba
16′	Diaph.	3	L	Diaphone
16′	Viola Diap.	9	R	
16′	Contra Bass	7	L	Tibia
16′	Bourdon	8	L	Stopped Flute
16′	Bass Viole	10	L	Violin I
16′	Trom'e.	2	R	Trombone-Mirabilis
16′	Bombarde	1	R	Tuba
16′	Post Horn	5	R	
16′	Trumpet	4	R	
16′	Contra Fagotto	6	L	Oboe Horn
8′	Diaph. Diap.	3	L	Diaphone-Diaph. Diap.
8′	Open Diap.	11	L	
8′	Viola Diap.	9	R	
8′	Tibia Clausa	7	L	
8′	Clara.	12	L	Clarabella
8′	Flute	8	L	
8′	Cello	19	R	
8′	Cello Celeste	19-20	R	
8′	Violin I	10	L	
8′	Violin II	10-21	L	
8′	Viola	22	L	
8′	Tuba Mirabilis	2	R	
8′	Tuba	4	L	
8′	Trumpet	4	L	
8′	Clarinet	15	R	
8′	Oboe Horn	6	R	
4′	Octave	11	R	Open Diapason
4′	Tibia Flute	7	L	
4′	Clara.	12	L	
4′	Cello	19	R	
4′	Cello Celeste	19-20	R	
4′	Violin I	10	L	
4′	Violin II	10-21	L	
4′	Cornet	1	R	Tuba
16′	Piano	A	L	
8′	Piano	A	L	
	Bass Drum Loud	F	L	
	Bass Drum Soft	F	L	
	Cymbal	G	L	Stroke
	Chinese Gong Roll	I	L	
	Chinese Gong Stroke	I	L	
	Snare Drum Roll	H	L	
8′	Accompaniment Unis.			
8′	Orchestral Unis.			
8′	Solo Unis.			
8′	Bombarde Unis.			
8′	Post Horn			2019 piston (octave coupler)
	Ped. Octave			2019 piston
	Ped. Divide			2019 piston (bass and melody)
PEDAL SECOND TOUCH				**Pedal 2nd T. Division Plate**
8′	Chimes	E	R	
	Bass Drum Loud	F	L	
	Bass Drum Soft	F	L	
	Cymbal	G	L	Stroke
	Tympani Roll	F	L	Bass Drum reit
	Chinese Gong Stroke	I	L	
	Triangle	N	L	
32′	Bomb.			2019 piston
16′	Diaph.			2019 piston
16′	Bomb.			2019 piston
ACCOMPANIMENT (first manual)				**Accom. Division Plate**
16′	Viola Diap.	9	R	
16′	Contra Gems. T.C.	14	L	
16′	Bourdon	8	L	Stopped flute
16′	Contra Viola T.C.	22	L	

8′	Open Diap.	11	R	
8′	*Eng. Diap.*	25	L	
8′	Viola Diap.	9	R	
8′	*Muted Diap.*	26	L	
8′	Gems.	14	L	
8′	Gems. Celeste	14-30	L	
8′	*Melophone*	27	L	
8′	Tibia Clausa	7	L	
8′	Clara.	12	L	
8′	Stop. Flute	8	L	
8′	Violin I	10	L	
8′	Violin II	10-21	L	
8′	Viola	22	L	
8′	Viola Celeste	22-23	L	
8′	*Muted Strings*	37	L	2 ranks
8′	Trumpet	4	L	
8′	Eng. Horn	16	L	
8′	Clarinet	15	R	
8′	Oboe Horn	6	L	
8′	Kinura	17	L	
8′	Vox Humana	18	L	
4′	Open Diap.	11	R	
4′	*Octave*	39	L	
4′	Viola Diap.	9	L	
4′	Gems.	14	L	Gemshorn
4′	Tibia Flute	7	L	
4′	Clara.	12	L	
4′	Traverse Flute	8	L	Stopped flute
4′	Violin I	10	L	
4′	Violin II	10-21	L	
4′	Viola	22	L	
4′	Viola Celeste	22-23	L	
4′	Vox Humana	19	L	
2⅔′	Gems. Twelfth	14	L	
2⅔′	Nazard	8	L	Stopped flute
2′	Gems.	14	L	
2′	Piccolo	8	L	Stopped flute
2′	Fifteen.	22	L	Viola
1⅗′	Tierce	8	L	Stopped flute
1′	Gems.	14	L	
V	*Mixture*	42	L	*see chamber analysis*
8′	Piano	A	L	
4′	Piano	A	L	
8′	Vibra Harp	Q	L	
4′	Vibra harp	Q	L	
8′	Harp	B	R	
4′	Celesta	B	R	
4′	Xylo.	C	L	
2′	Glocken.	D	L	
	Snare Drum Roll	14	L	
	Snare Drum Stroke	14	L	
	Wood Block Roll	L	L	
	Wood Block Stroke	L	L	
	Castanets	K	L	
	Tambour.	K	L	
	Tom Tom	M	L	

8′	Orch. Unis.			
8′	Solo Unis.			
8′	Bomb. Unis.			
4′	Accom. Super			
8′	Diaph. Diap.			2019 piston
8′	Cellos II			2019 piston (ranks 19 and 20)
8′	Tuba			2019 piston
	Sub Octave			2019 piston (on accomp. A)
	Unison Off			2019 piston (on accomp. A)

ACCOMP. SECOND TOUCH — **Accom. 2nd T. Division Plate**

8′	Diaph. Diap.	3	L	
8′	Tibia Clausa	7	L	
8′	Cello	19	R	
8′	Cello Celeste	19-20	R	
8′	Violin I	10	L	
8′	Violin II	10-21	L	
8′	Tuba	1	R	
8′	Post Horn	5	R	
8′	Eng. Horn	16	R	
8′	Clarinet	15	R	
4′	Tibia Flute	7	L	
4′	Cornet	1	R	Tuba
2′	Glocken.	D	L	
8′	Chimes	E	R	
	Snare Drum Roll	H	R	
	Wood Block Stroke	L	L	
	Triangle	N	L	
	Bird	O	L	
	Sleigh Bells	P	L	
8′	Solo Unis.			
4′	Solo Super			
8′	Tuba Mir.			2019 piston
8′	Trump.			2019 piston
	Accomp. Traps			2019 piston
				(1st t. traps become 2nd touch

ORCHESTRAL (second manual) — **Orch. Division Plate**

16′	Open Diap. T.C.	11	R	
16′	Viola Diap.	9	R	
16′	Contra Tibia	7	L	
16′	Contra Clara. T.C.	12	L	
16′	Bass Cello T.C.	19	R	
16′	Bass Viole	10	L	Violin I
16′	Post Horn	5	R	
16′	Double Trumpet	4	L	
16′	Eng. Horn T.C.	16	L	
16′	Bass Clarinet T.C.	15	R	
16′	Contra Fagotto	6	L	Oboe Horn
16′	Vox Humana T.C.	18	L	
8′	Diaph. Diap.	3	L	
8′	Open Diap.	11	R	
8′	Gems.	14	L	
8′	Tibia Clausa	7	L	

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8′	Clara.	12	L	Clarabella
8′	Stop. Flute	8	L	
8′	Flauto Dolce	13	L	
8′	Cello	19	R	
8′	Cello Celeste	19-20	R	
8′	Violin I	10	L	
8′	Violin II	10-21	L	
8′	*Orch. Strings II*	35	L	2 ranks
8′	*Orch. Strings II*	36	L	2 ranks
8′	Viola	22	L	
8′	Viola Celeste	22-23	L	
8′	Tuba	1	R	
8′	Post Horn	5	R	
8′	Trumpet	4	L	
8′	Eng. Horn	16	L	
8′	Clarinet	15	R	
8′	Kinura	17	L	
8′	Vox Humana	18	L	
4′	Diaph. Diap.	3	L	
4′	Octave	11	R	Open Diapason
4′	Viola Diap.	9	R	
4′	Gems.	14	L	
4′	Tibia Flute	7	L	
4′	Clara.	12	L	
4′	Forest Flute	8	L	Stopped flute
4′	Flauto Dolce	13	R	
4′	Cello	19	R	
4′	Cello Celeste	19-20	R	
4′	Violin I	10	L	
4′	Violin II	10-21	L	
4′	Viola	22	L	
4′	Viola Celeste	22-23	L	
4′	Clarion	1	R	Tuba
4′	Trumpet	4	L	
4′	Clarinet	15	R	
4′	Oboe Horn	6	L	
4′	Vox Humana	18	L	
2⅔′	Twelfth	12	L	Clarabella
2⅔′	Nazard	8	L	Stopped flute
2′	Piccolo	12	L	Clarabella
2′	Flauto Dolce	13	R	
2′	Fifteen.	10	L	Violin I
2′	Viola 15th	22	L	
1⅗′	Tierce	8	L	Stopped flute
8′	Piano	A	L	
4′	Piano	A	L	
8′	Harp	B	R	
4′	Celesta	B	R	
4′	Xylo.	C	L	
2′	Glocken.	D	L	Stroke
2′	Orch. Bells	D	L	Reiterating
8′	Chimes	L	R	
	Snare Drum Roll	H	L	
8′	Accom. Unis.			
4′	Accom. Super			
16′	Orch. Sub			
4′	Orch. Super			
8′	Solo Unis.			
4′	Solo Super			
8′	Bomb. Unis.			
6⅔′	Solo			
5⅓′	Solo			
4⅘′	Solo			

2⅔′	Tibia	2019 piston
2′	Tibia	2019 piston
16′	Cels On	2019 piston 16′ strings become celestes
8′	Solo/Orch	2019 piston (Duplication, unassigned)
	Sub	2019 piston (on Orch.)
	Unison Off	2019 piston (on Orch.)

ORCHESTRAL SECOND TOUCH

				Orch. 2nd T. Division Plate
16′	Diaph.	3	L	Diaphone-Diaph. Diap.
16′	Contra Tibia	7	L	
16′	Bass Cello T.C.	19	R	
16′	Bass-Cello Celeste T.C.	19-20	R	
16′	Trom'e.	3	L	Bombarde-Tuba
16′	Post Horn	5	L	
16′	Double Eng. Horn T.C.	16	L	
16′	Bass Clarinet T.C.	15	R	
8′	Tibia Clausa	7	L	
8′	Cello	19	R	
8′	Cello Celeste	19-20	R	
8′	Tuba	1	R	
8′	Eng. Horn	16	L	
8′	Clarinet	15	R	

SOLO (third manual)

16′	Diaph.	3	L	Diaphone-Diaph. Diap.
16′	Viola Diap.	7	L	
16′	Bass Cello T.C.	19	R	
16′	Cello Celeste T.C.	19-20	R	
16′	Bass Viole	10	L	Violin I
16′	BassViole II T.C. [*sic*]	10-21	R	Violin II, engraver error
16′	Trom'e.	1	R	Bombarde-Tuba
16′	Post Horn	5	R	
16′	Double Trumpet	4	L	
16′	Doub. Eng. Horn T.C.	16	L	
16′	Clarinet T.C.	15	R	
16′	Contra Fagotto	6	L	Oboe Horn
16′	Vox Humana T.C.	18	L	
8′	Diaph. Diap.	3	L	
8′	Viola Diap.	9	R	
8′	Gems.	14	L	
8′	Tibia Clausa	7	L	
8′	Clara.	12	L	
8′	Flauto Dolce	13	R	
8′	Cello	19	R	
8′	Cello Celeste	19-20	R	
8′	Violin I	10	R	

8′	Violin II	10-21	R	
8′	Tuba	1	R	
8′	Post Horn	5	R	
8′	*Brass Trumpet*	31	R	
8′	Trumpet	4	L	
8′	*French Horn*	33	R	
8′	*Saxo.*	32	R	Saxophone
8′	*Orch. Oboe*	34	R	
8′	Eng. Horn	16	L	
8′	Clarinet	15	R	
8′	Oboe Horn	6	L	
8′	Kinura	17	L	
8′	Vox Humana	18	L	
4′	Diaph. Diap.	3	L	
4′	Viola Diap.	9	R	
4′	Gems.	14	L	
4′	Tibia Flute	7	L	
4′	Clara.	12	L	
4′	Flauto Dolce	13	R	
4′	Cello	19	R	
4′	Cello Celeste	19-20	R	
4′	Violin I	10	L	
4′	Violin II	10-21	L	
4′	Cornet	1	R	Tuba
4′	Trumpet	4	L	
4′	Oboe Horn	6	L	
4′	Vox Humana	18	L	
2⅔′	Tibia Nazard	7	L	
2′	Gems.	14	L	
2′	Tibia Piccolo	7	L	
16′	Piano	A	L	
8′	Piano	A	L	
4′	Piano	A	L	
8′	Harp	B	R	
4′	Celesta	B	R	
4′	Xylo.	C	L	
2′	Xylo.	C	L	
2′	Glocken.	D	L	Stroke
2′	Orch. Bells	D	L	Reiterating
8′	Chimes	E	R	
4′	Solo Super			
	Sub Octave			2019 piston (on Solo)
	Unison Off			2019 piston (on Solo)
16′	Bomb./Solo			2019 piston
8′	Bomb./Solo			2019 piston
8′	Orch./Solo			2019 piston

BOMBARDE (fourth manual)

16′	Viola Diap.	9	R	
16′	Flauto Dolce T.C.	13	R	
16′	Tuba	1	R	
8′	*Diap. Major*	24	R	
8′	Open Diap.	11	R	
8′	Viola Diap.	9	R	
8′	Gems.	14	L	
8′	*Flute Overte*	28	R	
8′	*Flute Celeste*	13-29	L	Engraver error, should be R.
8′	Cello	19	R	
8′	Cello Celeste	19-20	R	
8′	Tuba Mirabilis	2	R	
8′	Tuba	1	R	
4′	*Major Octave*	38	R	
4′	Octave II	9	R	Viola Diapason
4′	Gems.	14	L	
4′	Flauto Dolce	13	R	
4′	Tuba Clarion	2	R	Mirabilis
2′	*Major Fifteen.*	40	R	
VII	*Grand Mixture*	41	R	C: 2⅔, 2, 1⅗, 1⅓, 1, ⅔, ½
2⅔′	Dolce Twelfth	13	R	Flauto Dolce
2′	Fifteen.	13	R	Flauto Dolce
⅓′	Nineteen.	13	R	Flauto Dolce
1′	Twenty Second	13	R	Flauto Dolce
16′	Piano	A	L	
8′	Piano	A	L	
4′	Piano	A	L	
8′	Vibra Harp	Q	L	
4′	Vibra Harp	Q	L	
8′	Harp	B	R	
4′	Celesta	B	R	
4′	Xylo.	C	L	
2′	Xylo.	C	L	
2′	Glocken.	D	L	Stroke
2′	Orch. Bells	D	L	Reiterating
8′	Chimes	E	R	
16′	Accom. Sub			
8′	Accom. Unis.			
4′	Accom. Super			
8′	Orch. Unis.			
4′	Orch. Super			
4′	Bomb. Super			
16′	Tuba Mir.	2	R	2019 piston
8′	Diaph. Diap.	3	L	2019 piston
8′	Post Horn	5	R	2019 piston
8′	Tibia	5	L	2019 piston
4′	Tibia	5	L	2019 piston
	Sub Octave			2019 piston (on Bomb.)
	Unison Off			2019 piston (on Bomb.)

VIBRATOS

Vibratos

10″	Wind Left	
15″	Wind Left	
10″	Wind Right	
15″	Wind Right	
	Tibia Left	
	Vox Left	
	Blank	2019 Tibia Forte
	Blank	2019 25″ Right

ADRIAN PHILLIPS THEATER

CONSOLE APPOINTMENTS

Unlabeled "on" indicator lamp
Signal button for projection booth and indicator lamp, believed never to have been connected

Manual key slips

Divisional pistons: 1-8 (manual and pedal toe)
General pistons: 1-8
General Cancel piston: 0
Vibra Harp Cancel piston (moves tablets)
Traps Cancel piston (moves tablets)
Trems Cancel piston (moves tablets)
Drums On piston (moves tablets)
Unison On-Off pistons in key cheeks for each division, removed 2019, functions now in drawer

Foot levers
Triangle (toe piston)
Bird Call I (toe piston, left side)
Bird Call II (toe piston, right side, same bird)
Sleigh Bells (toe piston)
(Drums): *Tympani* on first touch; *Bass Drum* on second
(Gongs): *Chinese Gong* roll on first: stroke on second
Piano Soft (reversible, with indicator lamp-*una chorda*)
Chimes Soft (reversible, with indicator lamp-soft mallets)
Chimes Sustain (reversible, with indicator lamp–dampers off)
Vibra Harp Sustain (hitchdown, with indicator lamp-spinner motor on)
Grand Crash: *Bass & Snare Drums, Cymbal*
Sforzando (reversible, with indicator lamp)
Setter (toe piston)
Master Pedal Lock (reversible, with indicator lamp, original function unknown)
Crescendo pedal with lever gauge and indicator lamp
Balanced *Left* and *Right* expression pedals with lever gauges

GENERAL

Compasses: 61-note manuals, 32-note pedal, all conform to A.G.O. standards
Combination action: originally a setterboard, replaced with *Opus-Two* system by Ken Chrome, 2013. Multi-level, folders with 50 levels in each folder, (A, B, C, D, and multi-levels assignable to individuals with locking function); assignable pistons, programmable crescendo and sforzando; full record and playback functions, accessed in concealed drawer. The stoplist additions in 2019, including moving the *Unison Off* functions from the key cheeks, are affected by the combination action, the pistons are lighted, and act like on-off reversibles.
Relays: Originally pneumatic, destroyed in 1999 building renovation; now part of *Opus-Two* control system.
Console: Shell original, 1930 keyboards and stop tab assemblies in poor condition by 2013 and now in storage. Pneumatic console machinery replaced with solid state equipment 2013, parts in storage. New stop tablets/assemblies 2013, new keyboards from OSI.
Shade action: upper and lower frame sets in each chamber, individual shutter motors
Chamber layout: three-tier structure: reservoirs, trems, traps first level, pipes and chests levels two and three. Toy counter (Left chamber) moved in 2019 from ground level to level 3 to permit service egress on level 1.
Blowers: Main: Spencer 30 hp 20″ static; High Pressure: Spencer 5 hp step-up
Wind system: The blowers feed statics, branching to multiple divisional reservoirs, all sprung. The wind lines are galvanized, the "vibrators" are pneumatic.
Pitch A440; Equal Temperament
Pipe composition: The tubas and French horn bells are heavy linen-side-out common metal (28% tins) as are the phonons and metal flute pipes; the most brilliant strings are tin, and the majority of the fluework is spotted metal. The flue stops all have zinc basses. The balance of the reed stops have spotted bells on zinc stems with spotted resonator trebles in certain stops; but the cylindrical-body reeds are spotted metal throughout with zinc basses. The wood flue pipes are pine with a variety of mouth, block, and cap constructions, with open common-metal trebles. The diaphones and trombone bass resonators are thick pine. The majority of the pipework has tuning slots (i.e. *expressions*); the phonons, open flutes and smallest trebles are dead-length.

A contemporary view of the Ballroom as seen from the stage.

JIM WHELAN BOARDWALK HALL
Adrian Phillips Theater
Atlantic City, New Jersey

W.W. KIMBALL
Chicago, Illinois
K.P.O. 7073, 1930

THE ORGAN IS DIVIDED BETWEEN TWO LARGE CHAMBERS ON either side of the stage and speaks through grillwork. The chambers are labeled Left and Right, rather than the more typical theatre organ division of Main and Solo–although the grouping of stops in these chambers generally follows a similar pattern of assignment, so the division of resources would have felt familiar to a visiting theatre organist. The majority of ranks are on unit actions while the straight stops are on Kimball's standard pitman chest. There are no unenclosed stops, and the individual shutter motors allow the double walls of shutters (upper and lower sets) to respond quickly. While the organ was intended to accompany motion pictures, the toy counter contains only musical percussions and there are no sound effect traps such as horses, sirens, train whistles, and doorbells.

In general, the unitized stops retain their familial name across the manual pitch range to provide clarity of source, but might have a different name for their pedal appearances: The Pedal *Bombarde* becomes the *Trombone* in the Solo, conversely the Pedal *Trombone* is the 16-foot extension of the *Mirabilis* and originally only available in that division; the *Contra Bass* in the Pedal is the *Tibia Clausa* found elsewhere, etc. The only real source of ambiguity comes from a variety of names applied to various upperwork extensions.

All the mutation pitches are derived–purity of tuning obviously not a big issue in these ensembles–the utility of developing color flexibility from non-chorus registers being of greater importance. The straight stops with the exception of the Mixtures, have an octave extension taking them through the top of the super couplers. The unit stops will similarly operate through super couplers up to the limit of a rank's range, (although two solo reed registers have only 61 pipes), but certain chorus stops like the two tuba registers even carry the four-foot pitch range through octave extensions. The celeste stops (*Cello, Violin II, etc.)* all draw their prime.

All metal flue ranks longer than four-foot have zinc basses. The assigned stop number/letter (in parenthesis below) and chamber are stamped on each stop key for the organist's reference indicating the parent rank and location.

The percussions utilize a variety of mallet constructions to achieve the desired effects–loud (hard) and soft for certain tuned percussions–for the large drum for example, a soft mallet strikes in the center for the *Bass Drum*, with a hard striking pair near the rim with reiterating action creating the *Tympani*.

LEFT CHAMBER

Range	Rank	Pipes	Pressure	Notes
16-4	(3) Diaphone–Diaphonic Diapason	85	15″	14″x 14″ wood diaphone 1-24, then heavy linen lead with leathered lips, tuned dead-length
16-4	(4) Trumpet	85	15″	Sc. 7½″, English-style trumpet, common metal bells on zinc, spotted metal flue trebles
16-4	(6) Contra Fagotto–Oboe Horn	85	10″	Sc. 5½″, spotted bell-on-zinc stem "oboe" construction, spotted metal flue trebles
16-2	(7) Contra Bass–Tibia Clausa	97	10″	11½″x 9½″, wood, leathered lips, spotted open metal trebles
16-1	(8) Bourdon-Stopped Flute	101	10″	7⅛″x 6″ 1-24 stopped wood then linen lead, open spotted metal trebles
16-4	(10) Bass Viole–Violin I	97	10″	Sc. 48, *Viol d'Orchestre* construction, tin
8-2	(12) Clarabella	85	10″	5½″x 6½″, open wood with inverted mouths, dead-length, harmonic common metal trebles from 1′
8-1	(14) Gemshorn	97	10″	Sc. 46, spotted metal, strongly tapered
8	(16) English Horn	61	10″	Sc. 5″, double-cone common-metal bells with small side hole on zinc stems, spotted metal flue trebles
8	(17) Kinura	61	10″	"large scale", fractional-length resonators, duck-bill shallots, spotted metal flue trebles
8-4	(18) Vox Humana	73	10″	"large scale", fractional-length cylindrical spotted metal resonators on long tuned-resonance boots, lifting lid with oval aperture, flue trebles
8-4	(21) Violin II (Celeste)	73	10″	Sc. 60, full compass, tuned ♯, spotted metal
8-2	(22) Viola	85	10″	Sc. 55, spotted metal
8-4	(23) Viola Celeste	73	10″	Sc. 55, spotted metal, full compass, tuned ♯

ADRIAN PHILLIPS THEATER

Straight stops

8	(25) English Diapason	73	10″	Sc. 43, spotted metal
8	(26) Muted Diapason	73	10″	Sc. 40, linen lead, leathered upper lips, slight taper
8	(27) Melophone	73	10″	6⅝″ square, open wood, 1-18 with rollers and ears, tuning slots
8	(30) Gemshorn Celeste	73	10″	Sc. 46, spotted metal, *Gemshorn* construction, tuned ♯
8	(35) Orchestral Strings I (*2 rks.*)	134	10″	Sc. 63, tin, Vd'O construction, tuned ♯, celeste rank t.c.
8	(36) Orchestral Strings II (*2 rks.*)	134	10″	Sc. 60, tin, Vd'O construction, tuned ♯, celeste rank t.c.
8	(37) Muted Strings (*2 rks.*)	134	10″	Sc. 60/76, tin, *Viole Sourdine* construction, ♭ celeste from t.c. three scales narrower than the prime
4	(39) Octave Diapason	73	10″	Sc. 53 (Sc. 41@8′), spotted metal
V	(42) Mixture	305	10″	Spotted metal, quints one scale smaller than unisons, tuned dead-length:

C	2	1⅓	1	⅔	½
f¹	4	2⅔	2	1⅓	1
c♯³	8	5⅓	4	2⅔	2

Percusssions

16-4	(A) Piano (the original Kimball grand was unenclosed on stage, now in private hands)
8-4	(B) Harp
4-2	(C) Xylophone, 49 bars (t.c.)
2	(D) Glockenspiel, 37 bars (t.c.); Orchestral Bells on reiterator action
	(F) Bass Drum; Tympani on reiterator action
	(G) Cymbal
	(H) Snare Drum
	(I) Chinese Gong
	(J) Castanets
	(K) Tambourine
	(L) Wood Block
	(M) Tom Tom
	(N) Triangle
	(O) Bird call I, II (II playable only by Pedal piston)
	(P) Sleigh bells (single effect, not a tuned set)

Right chamber: the 4 straight reed ranks. PHOTO: Nathan Bryson

RIGHT CHAMBER

Pitch	*Rank*	*Pipes*	*Pressure*	*Notes*
32-4	(1) Bombarde-Tuba-Cornet	97	25″	Sc. 15″, heavy common metal bells on zinc, harmonic mid-range, flue trebles
16-4	(2) Trombone-Mirabilis-Clarion	85	25″	Sc. 11½″ square, wood 1-24; heavy common metal bells on zinc, harmonic mid-range, flue trebles
16-8	(5) Post Horn	85	15″	Sc. 5½″, "oboe"-style resonators with common metal bells on zinc stems, duck-bill shallots, spotted metal flue trebles
16-4	(9) Viola (*Violin*) Diapason	85	10″	Sc. 36 (Sc. 48@8′), spotted metal
8-4	(11) Open Diapason	73	10″	Sc. 41, linen lead
8-1	(13) Flauto Dolce	97	10″	Sc. 47, spotted metal, mild taper,
8	(15) Clarinet	73	10″	Sc. 1¹⁵⁄₁₆″, linen lead, ½-length cylindrical
8-4	(19) Cello	73	10″	Sc. 53, spotted metal
8-4	(20) Cello Celeste	73	10″	Sc. 53, spotted metal, full compass, tuned ♯

Straight Stops

8	(24) Diapason Major	73	10″	Sc. 39, linen lead
8	(28) Flute Overte [*sic*]	73	10″	Sc. 40, linen lead
8	(29) Flute Celeste	73	10″	Sc. 47, spotted metal, *Flauto Dolce* construction, tuned ♯
8	(31) Brass Trumpet	73	15″	Sc. 6½″, spun-brass resonators, spotted metal flue trebles
8	(32) Saxophone	73	10″	Sc. 2½″, spotted metal, full-length cylindrical, linen lead "English horn" double-conical bell with large side hole, flue trebles
8	(33) French Horn	73	10″	Sc. 7½″, heavy common metal bells on zinc, capped, large-scale flue trebles
8	(34) Orchestral Oboe	73	10″	Sc. 2½″, tin bells on zinc stems-very long single taper, capped, very long *expression* slotting, flue trebles
4	(38) Major Octave	73	10″	Sc. 52 (Sc. 40@8′), spotted metal
2	(40) Major Fifteenth	73	10″	Sc. 65 (Sc. 41@8′), spotted metal
VII	(41) Grand Mixture	511	10″	Spotted metal, off-unisons narrower than unisons, tuned dead-length:

C	2⅔	2	1⅗	1⅓	1	⅔	½
g♯	4	2⅔	2	1⅗	1⅓	1	⅔
g♯¹	5⅓	4	2⅔	2	1⅗	1⅓	1
g♯²	16	8	5⅓	4	3⅕	2⅔	2
d⁴	21⅓	16	10⅔	8	5⅓	4	3⅕

Percussions

8	(E) Chimes	25 tubes	
8-4	(Q) Vibra Harp	61 bars	added during construction

ROLL PLAYER: This organ was also equipped with a roll player, unusual for an organ so large. The machinery is extant, but non-functional at present. Restoration of the player is included in the long-range planning for the Boardwalk Hall organs. Reproducing players were not as common in the Kimball *oeuvre* as they were in companies like Möller, Aeolian, Welte, and Skinner which had developed their own proprietary systems primarily geared to the residence and mortuary markets. Kimball had developed its own player system early on, but later in its corporate evolution utilized sophisticated systems purchased from Welte, Welte-Tripp, and Roesler-Hunholtz. The latter company was a market supplier of top-of-the-market proprietary roll-playing systems of their own design. Their organ systems came in three sizes, (*Standard, Consolette, Concert*), geared to the size of the instrument being controlled. They built an especially versatile machine that could also accommodate standard piano rolls. Whereas the organ builders serving residential markets had catalogs featuring a broad-range of selections including standard organ repertoire, their offerings emphasized symphonic transcriptions of the most well-known orchestral and operatic masterworks. The Roesler-Hunholtz organ roll catalog on the other hand, was more theatrical in nature, offering live recorded performances of popular melodies and jazz. The orchestration for the *Concert* model permitted three-manual performance with accompaniment, solo, and countermelody. This company also used heavy coated roll paper, allowing their rolls to have decades-long viability. Forensic examination of the extant rolls and machinery of the Boardwalk Hall Kimball will be conducted in the near future to conclusively determine the manufacturer of the organ's roll player. This comes with a library of nearly 40 rolls, and the player controls thirteen of the organ's unified ranks–an unusually large number for a typical roll-playing machine, due to a) the growing complexity of the stop controls as an instrument's rank count increases, and b) the majority of organs with roll players were typically smaller than 10 ranks. It may be that the original function of the player may have been to accompany ballroom dancing, or possibly to provide background music during a variety of events.

VENUE NAME CHANGE: Originally conceived as an all-purpose venue, the three primary functions of the original space and organ were for the projection of motion pictures with balcony seating and moveable seating set up on floor, stage productions, and gala ballroom dancing on the vast wooden floor. The classically-appointed space with its floor-to-ceiling windows looking out over the Atlantic Ocean was referred to as the Ballroom to differentiate its purpose from the neighboring Convention Hall. The seating capacity of the room was rated at over 5,000 in the advertising hyperbole of the day–perhaps if people are crammed tight against the stage, back wall, and each other. Today, a more realistic Fire Marshal-approved seating capacity in the balcony and main floor is rated at 3,200. Recently the production facilities were upgraded with new state-of-the-art lighting and sound equipment. The former Adrian Phillips Ballroom has not hosted dancing for many decades and that once elegant form of social entertainment has sadly gone out of fashion. Phillips was the originator of the Miss Universe Pageant and was a driving force behind the Convention Hall's construction. Following the upgrading of the stage equipment in 2016, the performance space was rechristened the Adrian Phillips Theater to more accurately reflect its contemporary function as a theatre-style raked-seating performance space.

REFERENCES: Stephen D. Smith, *Atlantic City's Musical Masterpiece,* (2002); *W.W. Kimball Company as Organ Builders: Their History, Instruments & Legacy,* James W. Guyer, 2016 DMus dissertation; the American Organ Archives of the Organ Historical Society, the Joseph McCabe photo archive, and Charles Kegg for extensive information on roll-player actions. Special thanks are due Nathan Bryson and the Atlantic City convention committee for their invaluable assistance photographing console stop jambs, providing countless chamber details, historical background, and proofreading.

ADRIAN PHILLIPS THEATER

ESSAY I BY **NATHAN BRYSON**

Adrian Phillips Theater
Jim Whelan Boardwalk Hall
Atlantic City, New Jersey
W.W. Kimball, Op. 7073, 1930

THE W.W. KIMBALL ORGAN, OPUS 7073, OF THE ADRIAN PHILLIPS Theater is one of the largest such original installations left in a public entertainment venue in the nation. Boasting an impressive four manuals, 55 ranks, and 4,151 pipes, in any other venue it would be the showcase instrument, but it often finds itself overshadowed by its much larger neighbor, the seven-manual, 449-rank Midmer-Losh organ located in adjacent arena.

The Theater itself, is a room of gigantic proportions. It is 181 feet long, 128 feet wide, and 75 feet high, and seats 3,000 people (including the rear balcony). The organ is situated in two chambers, one on each side of the stage in the standard Main–Solo arrangement typical for most theatre organs of the era. The console is located in the musician's balcony (a transposed orchestra pit) halfway along the inner side of the room about 110 feet from the nearest chamber and about 150 feet from the left chamber (facing the stage).

Designed with the accompaniment of motion pictures in mind, it is especially successful at creating the illusion of a full symphony orchestra as well as producing an incredible array of unique sound effects such as birds, trains, sirens and gongs. It was the intention of Mr. Lincoln Dickey, the first manager of the Hall to use this room both as a dance hall and as a motion picture theatre. Therefore, he wanted an organ of the orchestral type, or as he viewed it, a "theatre organ". Emerson Richards, architect of both instruments in the Hall, was unwilling to design the organ for the limited purpose of accompanying motion pictures and therefore proposed an instrument that was orchestral in character but would likewise have the foundation of a classic pipe organ ensemble. To accomplish this, he departed from the usual design of eight to fifteen "units" of orchestral reeds, flutes, strings, and diaphones all on high wind pressures, and included proper choruses of diapasons, mixtures and reeds in each chamber. The resulting specification includes nineteen straight stops and twenty-three unit stops. The combination proved to be an outstanding success and an organ of solid but brilliant character resulted.

The instrument was completed in 1930 and dedicated on May 25th in a recital by organist Rollo Maitland. Since its completion, the Kimball organ has played for countless graduation ceremonies, religious services, conventions, and dinners. The oft-overlook instrument soldiered on faithfully for many decades receiving only occasional care from curators whose attention was stretched thin as they cared for a campus-wide total of 504 ranks with a shoestring budget.

With a massive wall of windows facing the Atlantic Ocean, one is hard-pressed to find a more idyllic setting than the Adrian Phillips Theater. The proximity to the ocean and lack of conditioned air in the room for the first four decades of the instrument's life, took its inescapable toll. The chambers, with their exceptionally thick shades that automatically close when the organ's blowers are off, fared better than the console which is prominently displayed in an open balcony. The chambers were by no means exempt from dirt buildup, some of which is still evident on two chests that have not had their pipework removed and rackboards re-finished, but the somewhat sheltered environment provided a modicum of protection.

The large four-manual horseshoe console, on the other hand, had no such chamber to shelter it from caustic dust and residue that inevitably accompanies trade shows and conventions. This airborne debris combined with vast humidity swings and frequent use resulted in significant deterioration of the handsome console by the last quarter of the twentieth century. Broken contacts, wiring failures, wind leaks and de-laminating keys combined to create a difficult playing experience. Injury was added to insult during the massive renovation of the building in 1999-2000 when the humongous cables to the relay were unceremoniously cut, the relay removed, and windlines to the high-pressure step-up blower were severed. What had been merely unpleasant became completely unplayable.

Despite the challenges facing both the Kimball and Midmer-Losh organs, a stalwart group of individuals continued to advocate for the organs and formed the *Atlantic City Convention Hall Organ Society*. Following the retirement of the third curator of organs, Dennis McGurk in 1998, this group took up the cause of protecting the organs with the goal of future restoration. As a result of their efforts, a $1.17 million-dollar grant was awarded by the New Jersey Sports and Exposition Authority, the owners of the building at that time, to be put towards the restoration of the Kimball organ and to return the Right Stage chamber of the Midmer-Losh to its pre-1998 state. It was a lengthy journey, but by 2005 a plan was set in place and restoration of the Kimball organ was slowly set in motion.

The fourth curator of organs, Carl Loeser, was brought on in 2007 and immediately set to work on the Kimball organ. The most significant damage was addressed first–a new solid-state relay was purchased in 2008 to replace the original pneumatic system. The console was sent out for restoration, making its way to Reno, Nevada to the shop of the late Ken Crome, who meticulously restored the elegant woodwork of the imposing console. The original pedalboard was restored, and new keyboards were procured from Organ Supply Industries. The keyboards were built as replicas of the original, with the same piston layout and second touch contacts. The decision was made to install new electric stop action motors and a multi-level combination action. The original stop tabs were considerably

deteriorated, and new tabs were purchased. The exact specification and layout, however, were carefully retained. The console was restored to active service ca. 2012 and the renovated Kimball was showcased publicly in 2013.

Concurrent with the console work, two chests from the Solo division were removed for restoration. The high-pressure reeds, Solo cellos, and several color reeds were all restored and the chests rewired. The remaining chests, including offsets, retained their original wiring and were connected to the new relay.

With the Kimball organ playing once again, the organ resumed its role in the life of the theatre and was featured during the Wedding of Sea, a large Catholic service held annually at Boardwalk Hall, in silent films and regular tours. Behind-the-scenes restoration work continued slowly, but with the Kimball playing, much attention once again shifted to its larger sibling. That trend shifted somewhat in 2019, thanks to a grant from the American Theater Organ Society. The grant paid for the materials needed to releather all four of the large manual chests in the Main chamber (left stage), clean flue pipework, rewire the chests and replace the tuning slides on the *Mixture V*. All note pouches were replaced, primaries releathered for both pitman chests and unit stops, new valves installed, and gasket material replaced. With the pipework removed from several of the chests, the opportunity presented itself to releather some of the bass offset chests that would have otherwise been impossible to reach. A few bass offset chests still require releathering but are functional and can be accessed without removing pipework. Likewise, several tremulants and wind regulators will be restored as time and funds permit.

A second grant from the ATOS was awarded in 2020 and proved to be a significant and unexpected blessing. The grant would cover materials for the two Solo chests that had not yet been re-leathered as well as the restoration of the *Brass Trumpet 8′* by Trivo. At 11:00 a.m. on March 16, 2020, our staff along with all other staff in Boardwalk Hall were called into a meeting and told the building would be closing at 5:00 p.m. that day and the governor's stay-at-home order put into effect immediately. We very quickly dropped bottom boards and pouch boards from the two Solo chests and loaded our cars with Kimball parts and the appropriate tools to work at home for what we thought would be a relatively short quarantine period. As weeks stretched into months, we were able to return and gather more material to work on in our personal workshops and majority of the releathering of the two chests, pouches, primaries and gasketing, was all done at home. As in the Main chamber, select offset chests remain to be releathered and several ranks of pipes along with their respective rack and toe boards will be cleaned as time permits.

Another recent project has been to remove the large expression shutters, four at a time, to clean and regrease bearings, and replace the felt gaskets. Already enormously effective, the shades move quietly and quickly, giving the organist a maximum range of dynamic expression. In May 2021 we were able to acquire the original Kimball nine-foot concert grand piano that was originally delivered with the organ in 1930. While no official records have been found regarding its subsequent disposition, it is believed that the piano was sold as surplus around 1976 and made its way to a collector in New Jersey. It languished in a garage for the next four and a half decades until the owner passed away in 2020 and we were able to purchase the piano from his estate. We hope to connect it to the organ as it was originally intended in the very near future, completing the restoration of instrument's tonal resources. Finally, a roll-player capable of playing selected unit ranks remains extant in the balcony adjacent to the console, awaiting future restoration.

A rare full-on image of the massive Kimball console, normally obscured from view by its balcony placement.

CREDIT: Nathan Bryson

ADRIAN PHILLIPS THEATER

ESSAY II BY **SCOT HUNTINGON**

W.W. Kimball 1930
KPO. 7073
Designed and Supervised by Emerson Richards [1]

ADRIAN PHILLIPS, FOR WHOM THE GREAT BALLROOM WITHIN the Boardwalk Hall complex was named in tribute, was the creator of the iconic Miss American Pageant, and also the driving force behind the construction of the great hall itself. The ballroom is enormous, with a large stage house at one end and balcony at the other, and the hyperbole surrounding its opening claimed it could seat 5,000–not significantly less than the capacity of Radio City Music Hall (5,960). The organ was built by W.W. Kimball of Chicago and completed in 1931 for the generous cost of $47,500[2]. The Ballroom, like the neighboring Convention Hall, was conceived as a multi-purpose space, with ballroom dancing and movie presentation being two of the room's major functions. Lincoln Dickey, the first General Manager of the Hall, envisioned a typical theatre organ of the "unit orchestra" archetype. Theatre organ aficionados will see a parallel between two great sea-side dance halls–here, and the legendary Tower Ballroom in Blackpool England with its famous sprung wooden dancefloor and the remarkable 1934 3-14 Wurlitzer designed by the house organist–the inimitable Reginald Dixon. Both here and in Blackpool, the acoustics of these large open rectangular spaces with their hard plaster surfaces and wood floors are very favorable to organ tone.

When Al Jolson opened his mouth and sound came out in 1927's *The Jazz Singer,* the era of the silent movie was doomed. Senator Richards obviously realized this, and as the imperial organ architect to this great civic undertaking, he envisioned a remarkably flexible concert-style instrument having a unitized core developed along the orchestral lines manager Dickson wanted for his revenue attractions–but it would be once again as large with the addition of a legitimate choir of independent classical voices. With twenty-three unit ranks and thirty-two independent ranks, including two mixtures totaling twelve ranks as part of two complete and contrasting diapason choruses, the organ represented the ideal synthesis of both organ worlds–considered by many to be incompatible. Richards had more than a working knowledge of organ construction and tonal design, permitting him to not only conceptualize a musical scheme in theoretical detail, but the ability to bring the concept to fruition by working out the technical details in concert with an organbuilder.

The original concept for the famed Radio City Music Hall, was as a concert and event space for live performances, not as a first-run motion picture house. The organ, (intended to be built by Kimball but constructed by Wurlitzer to the Kimball design), was also conceived as a concert organ–not a theatrical presentation instrument–and bears a passing resemblance to Richard's design in its broad strokes, also including two contrasting Diapason choruses through mixtures, with numerous independent stops which were only assigned to a single home manual.

In 1930, the two premier organbuilders in the nation were Skinner in Boston and Kimball in Chicago. While Skinner developed its reputation along strictly classical lines, Kimball could play ball in both Orchestra Hall and Wrigley Field. With their extensive experience building theatre organs, they understood the tonal style of the unit orchestra and its ultra-high-pressure voicing requirements as well as the heavy physical demands for usage such instruments placed upon the mechanism–the action of Kimball's theatre instruments were heavily built and bullet-proof. Richards hoped Kimball would eventually build both organs in the convention complex, but circumstances eventually took the project in a different direction. The Kimball in the Phillips Theater represents the largest tonally unaltered organ of this genre still in its original home and acoustic.

It is perhaps easier to grasp the Senator's unique layman's understanding of the complexity of organ tonal matters here, rather than the monster organ in the adjoining room. Typically overshadowed by its big brother next door, if the Kimball were located in any other place, it would be celebrated as a great concert organ of its era. There is a finesse and intimacy that can be experienced with the voicing here, not only in the softer color stops but in the choruses, that is lost in the vastness of the Boardwalk Hall space. While the organ is a physical testament to the exquisite quality of the Kimball factory craftsmanship, tonally it is unlike any other Kimball.

Emerson Richards was a voluminous writer, appearing in the pages of organ magazines with regularity for over two decades. He and William Barnes carried on an extended conversation with each other across separate publications, regarding the merits (few) and evils (many) of unification. The Senator was an early and vocal proponent of the straight, classically-inspired ensemble during a period when any manner of vertical ensemble architecture above four-foot happened more by chance than design. In 1923, he wrote a series of articles in *The American Organist* leading up to the third installment in October where he concluded the ideal organ would contain both straight and unified voices in what he termed a "combination organ". In such a design, both straight and unit stops were essential parts of the whole. Considering the number of organs the Senator designed and which showcased his experimental ideas on a grand scale, the physical constraints of the Ballroom chambers forced the Senator to distill his ideas into a *multim-in-parvo* exercise, (a concept he would disavow only four years later).[3] His concept of the "augmented organ" on the other hand, was basically a straight organ which was

1. Console signature plate.

2. Emerson Richards, "Additional Reflections on the Organ of the Future as Others See It"; *The America Organist* hereafter *TAO,* (December 1934), 561. Here, the Senator claims the organ cost "nearly $65,000".

3. *TAO* August 1934, 561

expanded with unified ancillary voices that were not key components of the chorus framework. The vast Auditorium organ would be the *magnum opus* expression of that corollary concept. Shortly after the Auditorium organ was completed, Richards denounced unification entirely in his 1934 article, *The Decline and Fall of Extension in U.S.A.* [4]

Kimball had deservedly achieved a position of high repute during the 1920s. Boasting perhaps the highest standard of overall quality in the industry at the time, the organs were substantially built and finished (including the pipework), even during the 1930s when other builders was cutting corners to stay solvent while trying to remain competitive in a down market. Like Möller, their reputation had already been established building for the church market, so their reputation was not sullied by their cross-over to the movie theatre market. Kimball was serious competition for Skinner and Casavant as well as Wurlitzer and Robert Morton. The experience they gained dealing with high pressure and extreme orchestral voicing combined with workhorse windchest designs put them in a position to build organs across a broad range of client requirements: private residences and lodge rooms, churches and synagogues, movie theatres, civic auditoriums and vast convention halls. Like Wurlitzer and Hope-Jones, they were comfortably fluent working on high pressures as the situation warranted and could produce musically satisfying results whether applying it in a classical or orchestral style. This versatility made them a logical choice to combine both genres in fulfillment of the Senator's vision for the Ballroom's crossover instrument.

While David Junchen describes George Michel, Kimball's legendary head voicer, as the voice of the Kimball organ, during the period 1929-1933 he attributes its soul to Robert Pier Elliot (1871-1941).[5] Michel was equally adept at flue and reed voicing–a multiplicity of talent unique in the organ world. Builders of theatre organs had special voicing attributes that became signature tone elements associated with their brand: Wurlitzer for tibias and reeds, Möller for diapasons, and Kimball for unequaled string voicing. George Michel was the craftsman who perfected the voicing of the latter in Kimball instruments–celebrated in his own day and having achieved the status of legend in ours. So unequaled was the eloquence of Kimball string voicing, the Wanamaker Department store commissioned the pipework for world-renowned 88-rank String Organ from the Kimball company, and with it came considerable luster for the brand.

Another legendary voicer jewel in the Kimball crown was Joseph J. Carruthers (1855–1937). Having apprenticed with Gray & Davison in London, he was one of the original disciples of Robert Hope-Jones in Birkenhead. He followed Hope-Jones to the United States, then to Wurlitzer, leaving for Kimball immediately after Robert's untimely death in 1914. He was intimately acquainted with Hope-Jones's tonal and technical ideas (and his evolution), and was considered the country's leading diaphone expert.

Robert Pier Elliot seemed to have worked with everyone who was anybody during his half-century in organbuilding. Beginning a career building tracker organs with the Michigan builder Granville Wood & Son in 1889, he met John Austin and helped him establish the eponymous company in 1898. He met Hope-Jones when Austin employed him briefly as Vice President in 1903, established the Kinetic Engineering Company in 1904, spent time in South America as a mining speculator, was President of the Hope-Jones company in Elmira in 1908, joined Kimball in 1914, California Organ Co. (successors to L.A. Art and later reorganized as Robert-Morton) in 1916, and back to Kimball two years later. Under his business direction, Kimball adopted electro-pneumatic action exclusively (1918) and branched into the theatre circuit at the inception of the craze (1921). In spite of being a Hope-Jones employee, he initially resisted the unit style of organ building, insisting their early cinema instruments be classically-designed instruments with judicious orchestral voicing in the additional elements.[6] In 1921, Kimball built a significant instrument to a mature unified design for the Stanley Theatre in Philadelphia. This 29-unit organ was built along the tonal and technical lines of Wurlitzer and Hope-Jones and was conceived by former H-J employees Elliot and Carruthers.[7] This lay the foundation that would be Kimball's standard theatre organ philosophy for the balance of the decade. It also was installed under the noses of M.P. Möller and their cut-throat Philadelphia representative, Ernest Luberoff. Möller had bid on this contract and lost, and this was therefore perceived as a mobster's invasion of Möller home turf.[8] The Kimball was an instant success and signaled to Möller they needed to up their game in the theatre department, (always seeming to be an entry late at the race regarding technology and trends, it took Möller another seven years to develop a fully-fledged unit organ[9]).

4. Stephen Smith, *Atlantic City's Musical Masterpiece,* Atlantic City Convention Hall Organ Society, Annapolis, 2002. The reader is directed to chapter 11, "A Straight Instrument or A Unit Organ?", 233-240. Richard's writings on the subject are quoted liberally throughout the chapter, but the absence of citations or a bibliography make finding the originals for context, challenging.

5. David Junchen, *Encyclopedia of the American Theatre Organ, Volume 1;* Showcase Publications, Pasadena, 1985; 208

6. *Ibid.*

7. *Ibid.*

8. Möller correspondence files held at the *American Organ Archive*. Opus 3112, Knickerbocker (Fay's) Theatre, Philadelphia, 1921, 4 manuals, 25 ranks; Ernst Luberoff Philadelphia sales representative correspondence with President M.P. Möller and V.P. and Sales Manager E.O. Shulenberger.

9. Möller under-estimated the wear constant daily wear took on the mechanism and their theatre organs wore out quickly. Theatre instruments were leased, and Möller found itself holding paper on worn-out organs the owners had stopped payment on and which were being replaced with instruments by other builders. Möller Opus 5566, 1929 at the Atlanta Fox was a trophy contract for the company and represented their mature Johnny-come-lately response to the earlier problem, with solidly over-built construction and extensive unification. As Möller's last organ built for a movie theatre, they went out in style. This was a no-expense-spared project, resulting in one of the finest (if not *the* finest) example of the genre ever built, by anyone.

The Welte company was eyeing the lucrative theatre and church markets and Elliot appeared to have an organbuilder's "Midas touch." They lured him away from Kimball in 1925, but not before he oversaw the construction of what would be Kimball's theatre organ *magnum opus*–the 4-37 for the Forum Theater in Los Angeles, (moved to the Wiltern in 1931[10]). During his short period with Welte, he transformed their instrument into a virtual carbon-copy of a Kimball but at a very competitive price–surely a source of great irritation in Chicago. When the sound of a talking film wafted into the Wurlitzer corporate boardroom, they saw the bottom about to drop out of their business and wanted to cut a piece of church pie for themselves. Elliot had by now developed the reputation as an organ-whisperer and was next lured to North Tonawanda, but their being wedded to unit action quickly soured Elliot on his future there. The theatre organ was a lucrative business with companies getting away with charging usury prices–but to Elliot that was only a means for making money, not Art. His first interest was the classically-inspired organ, and with the theatre organ market set to crash like a dropping anvil in a *Merry Melody* short, he knew where his future lay. Having made the corporate rounds of everybody who was anybody, and surely stealing what corporate secrets they all may have had, he finally settled back Chicago.[11]

Rejoining Kimball in 1929, the company's future course was clear–a return to "legitimate" organbuilding. No sooner had he arrived than the stock market crashed that October, sending shockwaves through organ factories from coast to coast. In the midst of this upheaval, Kimball is selected to build the quasi-concert organ for Atlantic City, to Senator Richards' plans for the Convention complex ballroom. Richards was originally a voice in the wilderness and at least a decade ahead of his time in his knowledge of and advocacy for the classically-inspired organ during the heyday of the symphonic instrument. His plans for a "combined" instrument drawing on both orchestral and classical elements was an ideal canvas for W.W. Kimball and their extensive experience working in both genres with distinction. Elliot would have found a knowledgeable compatriot in the Senator whose passion for a proper ensemble no doubt complimented his own.[12] If there were conflicts, none have been recorded and the result of their collaboration is an instrument as unique as it is artistically brilliant.

10. While the handsome theatre is still a performance venue, unfortunately this legendary organ has been broken up for parts.

11. *Ibid.*208-234. Junchen's sorting out Elliot's restless tour of the American organ world is the most accurate and thorough of the otherwise sketchy accounts of Elliot's career. This history of Kimball's association with the theatre organ genre is the best source of information about a major 20th-century player having a surprisingly elusive corporate biography.

12. Judging by Elliot's ability to command top compensation, his wandering work history, and propensity to leave employment in a cloud of corporate huff, he likely had a sizeable ego which would have met its match in the Senator, whom T. Scott Burman, editor of *The American Organist* in a moment of edgy clarity nicknamed "the Commander-in-Chief" (August, 1945). It was not lost on numerous detractors of the Convention Hall organ, that it was a suitably over-sized expression of the powerful legislator's ego and physical breadth.

It is doubtful Elliot could have had any involvement with Kimball's 5-123 *magnum opus* (1928) installed in the Minneapolis Municipal Auditorium, or the 5-34 installed in Samuel Rothafel's beloved Cathedral of the Motion Picture in New York (Roxy) the previous year. He would certainly have developed the original design for the organ being proposed (1931) for the venue that became known as the Radio City Music Hall. This instrument was ultimately constructed by Wurlitzer in 1932–33 to the Kimball specification.[13] Elliot's last important instrument before he departed Kimball was the spectacular 4-137 concert instrument installed in the Worcester, Massachusetts Memorial Auditorium. The 1933 organ is known for the blaze of its chorus reeds and tin principal chorus. It is perhaps Elliot's most eloquent testimony writ as a classical concert organ, while the Boardwalk Hall Phillips Theater instrument is Elliot putting a period on the glamorous era of the Kimball theatre organ.

For Elliot, born during the era when the classical organ was the norm, traversing the entirety of the orchestral organ revolution from its inception as an business necessity, and then being able to end his career back where he started–building classical organs incorporating the best of both worlds–must have been a satisfying coda for his career. Senator Richards was the driving force behind America's slow rediscovery of classical organbuilding beginning during the height of the orchestral organ era in the early 1920s. Richards and Elliot with their similar ideas regarding the importance of chorus construction as the backbone of good organ design, must have found a simpatico relationship with each other during the 1930 design of the Ballroom organ.

Whether the experience may have shaped Elliot's thought processes during the design of his 1932 Radio City proposal is interesting to contemplate. While both organs are classic organs built around a unified orchestral core, and both can produce rich theatre-organ ensembles, contemporary 2020's interpreters find these designs as cumbersome to work around as do their classical-repertoire colleagues.

The Ballroom organ, with its independent section of color stops and two contracting diapason choruses was unlike any other theatre

13. The exact reason for the change has never been conclusively proven, but since S.L. Rothafel had moved on to this theatre venue after having been maneuvered out of the Roxy, he would have naturally specified Kimball based on his prior good relationship with them involving the three-organ order he placed with them for the vast theatre bearing his name. However, John D. Rockefeller Jr. was financing the construction of the Radio City Center complex which later bore his name. The family had a relationship with Wurlitzer from the construction of a small organ in their family church in Pocantico Hills (Op.548, 1922), and Rockefeller wanting the best of all things, would have considered the Wurlitzer brand to carry a higher cachet than Kimball. Not to mention the Roxy Kimball was buried under the stage while the nearby Paramount with what is regarded as the finest Wurlitzer ever built in a near ideal acoustical position, would have made a bigger impression on a prospective buyer. As the person writing the checks, he would have had the final say. This would have represented a prominent job for Kimball at a time when work was scarce and the loss to a competitor aping their specification and who lacked their prestige in the "legitimate" organ genre, must have been bitter.

organ built for the purpose to that point. The Senator had been fully involved designing his monumental organ for the convention hall for several years, and in that context the Ballroom organ would not have been a priority project for him–especially its unified core which ran counter to Richards' most closely-held convictions regarding the design of proper choruses. He was also perhaps more prescient than building manager Dickey regarding the Kimball's function, and surely knew the organ would never accompany a motion picture unless as a special event. A concert organ was therefore called for–one capable of expressing both popular and concert literature, but whose resources were unfortunately restrained by the physical constraints of the chamber spaces allocated by the architect. The Senator used the available space and money in a way that would make the most impact–the independent chorus being sacrosanct–the synthesis of resources being a model for contemporary study towards an interpretation of the type of concert hall instrument once championed by Calvin Hampton[14]. For most modern concert halls, organ concerts are not a money maker and the large trophy organs installed behind the modern orchestra are largely an expensive stage set. When designing an instrument chiefly for the performance of the orchestral literature requiring an organ as part of the instrument complement, for a public hall where money and space are at a premium and where the organ will rarely be called upon in a solo capacity, Emerson Richards' theorems provide food for thought.

The typical Kimball theatre organ assumed its mature form in 1921 with the instrument designed by Elliot and Carruthers for the Philadelphia Stanley Theatre–and changed little until the silent picture had run its course eight years later. While the extensive application of unification followed the pattern established by Wurlitzer, (and staunchly resisted by Elliot in favor of straight designs for their earlier theatre instruments until the debut of the Stanley), the manual departments in Kimball instruments which were three-manuals and larger always included a Percussion manual where all the tuned percussion were gathered along with an odd assortment of reeds and flutes. The Great division's functionality was replaced with the Solo moniker in a three-manual, or the Orchestral label in four and five-manual dispositions. The five-manual Roxy organ added a Bombarde division specified with heavy brass and foundations at sixteen and eight-foot pitches with an assortment of lighter orchestral voices, which also controlled the famed dome Fanfare Organ[15].

14. In the 1960s, Hampton developed a specification with an efficiency of resources (45 stops) both straight and extended, capable of realizing the organ parts in the well-known symphonic and operatic works, as well as being able to provide a muscular foil to the orchestra in the standard concerto standard-bearers by Saint-Saens, Poulenc, Jongen, and Barber, among others. Distilled to its essence, the organ needed a full chorus of principals and reeds, reed tone of heroic proportions, weighty foundations, a soft flute or two, string and celeste, several stops for solo lines, and a range of thunderous bass voices from *piano* to *forte,* including Diaphones and 32′ tone, with the standard Swell and heroic voices under dynamic control.

15. Trumpet Fanfare 16′- 8′-4′, Military Bugle 8′, Fife 4′ on 25″ wind.

This pattern essentially continued for the Ballroom instrument, but here the Senator replaced Kimball's fourth-manual Percussion division with the Bombarde. Here as in a classically-designed organ, the Senator groups the instrument's heraldic resources into a lean disposition–the most powerful of the two independent diapason choruses from eight-foot through the reedy seven-rank tierce mixture; the foundational brass (Tuba chorus at 16, 8, 8, 4), including the only access to the massive independent *Tuba Mirabilis*. However, to this, he adds both the instrument's boldest and softest celestes, the full complement of tuned percussions (channeling the functionality of the Kimball Percussion department), and somewhat incongruously, the mildest of the instrument's four unitized choruses built upon its softest rank, (*Flauto Dolce 16′-1′*). The Orchestral division (manual two) and the Accompaniment (manual one) with its independent diapason chorus could couple up to the Bombarde–and if one discounts the full array of trick couplers on the Orchestral, makes the Bombarde the most powerful division in the organ.

The Accompaniment serves the purpose the name implies: the full complement of the organ's strings is available here, (excepting only the four-ranks of narrow *Orchestral Strings* assigned exclusively to the second keyboard); the instrument's minor diapason chorus 8.8.4.2.V; four minor unified choruses for color shading (*Viola Diapason, Gemshorn 16′-1′, Viola, Stopped Flute*); and the full array of rhythm traps typically found in this department.

The Solo (manual three) is richly orchestral in nature and contains the bulk of the organ's independent solo registers as well as the only fully unified *Tibia Clausa* chorus 16′-2′, the weightiest of the organ's diapasons–the phonon unified 16′-4′, and the instrument's largest complement of sixteen-foot stops–many being counter-balanced with four-foot extensions. The Solo functionally is as the secondary to the Orchestral division, specified too with generous unification of its symphonic registers, especially woodwinds and light brass.

The Kimball's Orchestral division is functionally its "theatre organ" Great, complimentary to the Bombarde's orientation as the "classical" Great. The nearly full range of the organ's string and undulant ensembles are grouped here; the dynamic shading of this manual's registers ranging from piano to forte can create an almost seamless crescendo with nearly endless shadings of subtlety available at eight and four with a representative range of sixteen-foot elements from the four tonal groups (foundation, brass, woodwind, string); and as found in the Accompaniment, there are also four unified ensembles through two-foot but of contrasting tone and power (*Flauto Dolce, Stopped Flute* 8′-1⅗′ but omitting 2′, *Viola, Violin, Clarabella*). The Solo mutation couplers function here, allowing the ability to create chords on a single note or ear-tingling tonal constructions.

The Senator was the Audsley of his generation–a theorist consultant who ultimately wielded great influence over the organ world of his day. While not a practicing organbuilder, he had an enlightened understanding of an organ's technical workings and processes. His

position as a powerful politician in the New Jersey State Legislature gave himself and his theories the perception of anointed legitimacy, and for the citizens of his district forced to finance his grand projects through taxation, an irresistible force. His vast inherited wealth from a string of lucrative bath houses allowed him the freedom to subsidize his schemes and to travel widely, exposing him to Europe's historic instruments–the lessons learned forming the foundation of his theories and himself which came to shape tonal theory in the U.S. for a generation. Every antique organ he visited had a structured ensemble, and this is where Richards' attention became focused.

In the early 1920s when the upperwork of the average symphonic organ was considered a colorant–even in the foundation choruses–Richards' advocacy for independent choruses crowned with a brilliant mixture was revolutionary. Likewise his understanding of the physics of tone based upon the harmonic series. The Atlantic City High School organ (1923) was the first blank palette where Richards could exercise his revolutionary concepts unfettered. This was also the first appearance of an unenclosed Choir division based on historic precedent that in just a few years would be found as a regular construct in the forward-thinking instruments of Walter Holtkamp Sr. and G. Donald Harrison. This was also the first appearance of a full complement of harmonic series mutations (not pure tuned however) and the powerful "Schulze" Mixture copied from St. Bartholomew's, Armley, Great Britain, (Edmund Schulze, 1879), which had made such an impact on the Senator that he specified it at the High School, St. Mark's Antiphonal, the Auditorium and ultimately in his own house organ as overseen by Harrison. Senator Richards' fondness for this mixture is also evident in the Kimball's five-rank Accompaniment *Mixture*, similarly follows the Schulze composition with its octave breaks, but with the second and third breaks moved up the scale to a musically less obtrusive position. The large Bombarde *Grand Mixture* with its mid-octave repetitions and grave-pitched third and fourth breaks going into the octave extension, seems particularly Richardsonian.

The typical Wurlitzer, based in large measure on the early tonal ideas of Robert Hope-Jones, had little in the way of actual chorus structure beyond the unification of a number of the mezzo stops to four-foot, and only a small flute would be extended through 2⅔′, 2′ and 1⅗′. This was the model other builders followed more or less to the nth degree. Larger instruments might see one of the strings also extended to two-foot. Through the influence of Paramount's balladeer Jesse Crawford, the *Tibia Clausa* would be extended at least through two and possibly to Tierce and one-foot as well. While none of these ensembles would be considered "choruses" by organbuilder standards, the unified Tibia would be the closest equivalent. For the orchestral or jazz player, upper and mutation work would primarily be used as a colorant or timbre creator. Large forte ensembles were constructed with handfuls of the organ's power stops at sixteen through four, but add the "upperwork" and turn off the tremulants, and the ensemble could be surprisingly bright and convincing with the higher color stops adding brightness to the rich reed ensembles.

However, the largest Kimball theatre instruments from 1921 onwards such as the Los Angeles Wiltern and New York City Roxy, specified a derived "Harmonics" mixture on the Solo division. There's no record of the 6-rank composition found on the Roxy organ, but the Wilton 4-rank stop borrowed the *Clarabella* at 2′ and the *Viola* at 1⅗′, 1⅓′, and 1′–pitches not otherwise available elsewhere.[16] This was the closest thing to a real mixture found in the theatre organ genre. When a builder conceives of a "classical" chorus, its elemental construction is vertical from foundation to crown, while the conception of the orchestral theatre ensemble is horizontal–masses of unison tone with octave extensions for timbre creation that bear no vertical relationship to one another in terms of scaling and voicing–each foundation rank is designed to create a specific imitation of orchestral tone. The theatre organist registers ensembles by color, i.e. tone painting in a manner of speaking. When a musician plays the classic literature requiring clarity of musical structure, one registers as a tonal architect creating chorus structures from individual elements which reinforce and build upon the harmonic structure of the fundamental tone.

It is in this context that Richards reimagines the role of upperwork and chorus structure within the theatre organ framework for the Ballroom instrument. A similar reimagined set of ensembles for the Radio City organ was specified by Elliot in the proposal eventually realized by Wurlitzer. On paper, these two organs outwardly are as different as they are similar. The desire to create an instrument with a dual personality by developing vertical ensemble construction out of both straight and unit ranks, was a freshly original concept.

At Atlantic City, Richards brings a literal interpretation of the divisional monikers, and provides each division with a wide but subtle palette of ensemble elements. His prolific expounding in the press of his organ architect theories regarding the place of straight and unit ensembles finds realization in his three signature Atlantic City instruments (main hall, theatre, high school): 1] major diapason choruses are straight with a musical relationship between each element, and 2] minor ensembles are provided by "secondary" stops of neutral or hybrid quality (flutes, gemshorns, dulcianas, etc.). The variety of tonal colorants on manuals one and two in the Kimball is luxurious, while the Solo and Bombarde depart from previous theatre organ interpretations of similar divisional namesakes by having tibia and diapason choruses placed exclusively in these divisions and only available elsewhere through coupling.

At Radio City, the divisional names also reflect the nature of their musical function. Here, unlike other Kimball organs of the style, there is a true Great (manual II) which in classical instrument fashion is the backbone of the organ. The specification is foundational

16. Junchen, *Encylopedia,* 222

with nary an orchestral voice in sight. All of the organ's diapasons are available here (five at eight-foot) as are the two and four-rank chorus mixtures. The three sixteen-foot stops are ensemble registers at *piano, mezzo,* and *forte*. The disposition of resources here is remarkably similar to the Ballroom Bombarde with the large principal and reed chorus available to create a legitimate classical full-organ ensemble.

The third manual at Radio City is titled Orchestral instead of the Solo typically found in the standard Wurlitzer. Like its namesake in other Kimball organs, it contains the instrument's full complement of strings, but curiously only at eight-foot pitch. It is also curious that at Radio City there is a paucity of sixteen-foot string tone, or even a massed string ensemble from 16′–2′ available anywhere in the instrument without couplers. The timbre upperwork is all flutes, but capped with an independent six-rank mixture. Manual four, the Solo, is where all the straight Solo-voiced stops reside, mostly reeds–likewise similar in concept to the Ballroom Solo. But it also contains the organ's most powerful reeds in chorus, and like the Ballroom, the epic *Tuba Mirabilis* is only available on this manual as a straight stop at unison pitch. The largest complement of sixteen-foot extensions resides here as does a minor *Tibia* chorus. What is perhaps a coincidental similarity to the Ballroom organ, the most powerful divisional ensemble in both organs regardless of divisional title, is accessed from the top manual. However, from the perspective of the "classical" symphonic transcription, at Radio City one can create a full organ ensemble (foundations, diapasons, and reeds), on the Great manual and play it against a solo line on the organ's most heraldic reed voices, something not possible on the Atlantic City Kimball.

If the musician carefully registers Radio City by the home division assignment of stops and avoids inter-manual duplexing, the ability to control the expression of the three main divisions individually for the performance of classic and transcription literature is easy. However it is this very convenience which makes the organ challenging when performing music in a popular vein. The Ballroom's division of Left and Right expression, essentially channeling the theatre organ's Main and Solo chambers, may make the expressive handling of this organ familiar to a theatre organist, but especially challenging for the performance of classical literature. These two organs thus stand in counterpoint to one another as to their expressive flexibility for the performance of orchestral and popular genres versus their comfort in the performance of standard concert repertoire.

Radio City Music Hall

(Originally called International Music Hall)
New York City, New York
Rudolf Wurlitzer Co. Op. 2179, 1933
Chamber Analysis for Comparison

UNIFIED RANKS MAY PLAY ON SEVERAL MANUALS, BUT THE distribution by chambers assigns the ranks by a "home" manual. Straight ranks are only available on one division, but the *Mirabilis* is also available on the Great via second touch. The only independent Pedal rank, the *Contrabass,* is unified through three pitches. Only the Pedal, Accompaniment and Great have second touch. The keyboards are, from bottom up: Accompaniment, Great, Orchestral, Solo. There are octave couplers (4′) on every division, and all ranks extend through the octave coupler extension except the mixtures. Stops unified above four-foot extend only through the top of the two-foot range. The organ's most powerful stops are all located in the Solo chamber.

Until the mixture compositions can be analyzed, it is intriguing to wonder whether they were designed by Elliot or Wurlitzer, and if the former, if he was influenced by Richards' compositions for Atlantic City.

GREAT CHAMBER, NO. 4, RIGHT

Range	Rank	Pipes	Pressure	Notes
16-1⅗	Lieblich Gedeckt	97	10″	wood, metal trebles
16-2	Muted Diapason	97	10″	Sc. 32, 44@8′
16-4	Viola	97	10″	Sc. 42, 54@8′
16-8	Trombone-Tromba-Clarion	85	15″	Sc. 8″, Trumpet No. 2@8′
16-8	French Horn	85	10″	Diaphone 8″@16′; reed 6″@8′
8-2	Concert Flute-Traverse Flute	85	10″	Sc. R (wood, Melodia construction)
8-4	Violins II	170	10″	Sc. 68, Vd'O construction, 2-rank celeste
8-2	Dulciana-Dolcetin	85	10″	Sc. 56
8-4	Unda Maris	85	10″	Sc. 56, celeste tuned♯
8	Clarinet	73	10″	Sc. small
8	Orchestral Oboe	73	10″	Sc. small
8-4	Chrysoglott	49		with dampers on-off (Harp and Celesta)
	Birds			multiple

APPENDIX

STRAIGHT RANKS

16-4	Contra Bass	56	10″	Sc. special; straight Pedal rank (Diapason type)
8	1st Diapason	73	10″	Sc. 39
8	2nd Diapason	73	10″	Sc. 42
4	Octave	73	10″	Sc. 54 (42@8′)
II	12 and 15	122	10″	Sc. 12th-64, 15th-67 (sc. 44 and 43@8′ respectively)
IV	Mixture	244	10″	#7 Mixture

ORCHESTRAL CHAMBER NO. 1, RIGHT

16-2	Violin Diapason	97	10″	Sc. 35 (47@8′)
16-2	Tibia Minor	97	10″	Sc. small special, wood and metal trebles
16-4	Waldhorn-Clarion	97	10″	Sc. 6″, R-Cornopean@8′
8	Trumpet	73	10″	R-brass
8	Vox Humana	73	10″	R
II	Vox Humana	146	10″	R and large, 2-rank celeste

STRAIGHT RANKS

8	Horn Diapason	73	10″	Sc. 45
II	Spitzflute Celeste	134	10″	Sc. Temple Sholom, 2-rank celeste
8	Gamba	73	10″	Sc. 58
8	Gamba Celeste	73	10″	Sc. 58, ♯ celeste
8	Salicional	73	10″	Sc. 64
8	Voix Celeste	73	10″	Sc. 64, ♯ celeste
II	Muted Violins	146	10″	Sc. 64, 2-rank celeste
VI	Mixture	366	10″	#12 Mixture
8	Oboe Horn	73	10″	R

SOLO CHAMBER NO. 1, LEFT

8	Melophone	73	15″	Sc. special, open wood, leathered
4-2	Harmonic Flute	73	15″	Sc. 58 regular
16-8	Violon 'cello	97	15″	Sc. 40 (52@8′)
8	'Cello Celeste	73	15″	Sc. 52, ♯ celeste
8	Saxophone	73	10″	Sc. regular, brass
16-8	English Horn	85	10″	Cor Anglais
8	Kinura	73	10″	Sc. regular
8	Basset Horn	73	10″	Sc. regular clarinet

SOLO CHAMBER NO. 2, LEFT

32	Sub Bass	12	15′	Sc. special, extension Tibia Clausa
16-2	Tibia Clausa-Piccolo	97	15″	Sc. large
32	Bombarde	12	15″	Sc. 32′ special, extension Tuba
16-4	Tuba Profunda-Sonora-Cornet	97	15″	Sc. regular Tuba Horn@16′
16	Diaphone	12	25″	Sc. Tuba Mirabilis 16′, wood, ext. Diaph. Dia.
8	Diaphonic Diapason	73	25″	Sc. 37, leathered
16-8	English Post Horn	85	15″	Sc. regular

STRAIGHT STOP

8	Tuba Mirabilis	73	25″	Sc. regular

PERCUSSION CHAMBER NO. 5, LEFT (shutters currently removed)

4-2	Xylophone	49 bars	
8	Marimba Harp	49 bars	
2	Glockenspiel	37 bars	Orchestral Bells on reiterator action
8	Cathedral Chimes	25 tubes	With dampers on-off
16-4	Grand Piano		Unenclosed

Snare Drums (Band, Orchestra), Tom-Tom, Bass Drums (Band, Orchestral, Thunder), Cymbals, Tambourine, Castanets, Chinese Block, Triangle, Shuffle, Chinese and Persian Gongs

Tremulants (high and low pressure terms in all divisions): Great, Orchestral, Solo, Tibia Clausa, Vox I, Vox II

CONCERT CHORUS REGISTRATIONS BY DIVISION

(unit stops in italics):

Accompaniment: *Violin Diapason* 8, *Muted Diapason* 8, 4; *Concert flute* 8,4,2; *Dulciana* 16,8,4,2; *Lieblich Gedeckt* 16, 8, 4, 2⅔, 2, 1⅗; *Wald Horn* 16, 8, 4

Great: 1st, 2nd Diapasons 8, Octave 4, 12&15, Mixture IV; *Diaphonic Diapason* 8, *Violin Diapason* 8, *Muted Diapason* 16, 8, 4, 2; *Lieblich Gedeckt* 16, 8, 4, 2; *Tromba* 16, 8, 4; *Trumpet* 8, *Tuba Sonora* 8

Orchestral: Mixture VI; *Diaphonic Diapason* 8, *Horn Diapason* 8, *Violin Diapason* 16, 8, 4; *Harmonic Flute* 4, 2; *Tibia Minor* 16, 8, 4, 2⅔, 2; *Lieblich Gedeckt* 8, 4, 2⅔, 2, 1⅗; *Wald Horn* 16, 8, 4; *Trumpet* 8; *Tuba Sonora* 8

Solo: *Diaphonic Diapason* 8; *Violin Diapason* 8; *Tibia Clausa* 16, 8, 4, 2⅔, 2; *Tibia Minor* 8, 4, 2⅔, 2; *Harmonic Flute* 4, 2; Tuba Mirabilis 8; *Post Horn* 16, 8; *Tuba Sonora* 16, 8, 4; *Wald Horn* 16, 8, 4; *Trumpet* 8

Pedal: Contra Bass 16, 8, 4; *Diaphone* 16, 8; *Muted Diapason* 16, 8, 4, III; *Tibia Minor* 64, 32, 16, 10⅔, 8, 4; *Post Horn* 16, 8; *Tuba Sonora* 32, 16, 10⅔, 8, 4; *Tromba* 16, 8, 4

SOURCES: Jack Courtnay, *Theatre Organ World;* Organ Literature Foundation reprint of 1946 1st edition, Braintree, Mass. 165-168

The Art Deco masterpiece shortly after its opening, showing both consoles with bolsters illuminated, the stage and orchestra elevators in position, and a rare glimpse of the empty stage house. This vista is now ruined by light poles and large-screen TV screens.

APPENDIX

ATLANTIC CITY HIGH SCHOOL

Auditorium
Board of Education, contractee
Atlantic City, New Jersey

Midmer-Losh, Inc., Op. 4920, 1923

Merrick, Long Island, New York
Architect: Emerson L. Richards

Completed: December 20, 1923 (enlarged from four to five manuals during 1924)
Cost: $31,500.00 (contracted), $42,425.00 (completion)

SOURCES: *The American Organist,* July 1924, 413-416; Stephen Smith; *Atlantic City's Musical Masterpiece,* Peter Randall, Portsmouth, N.H., 2002.

THIS STOPLIST IS NOT VERBATIM AS IT WOULD HAVE BEEN SEEN on the console. The magazine's editor, T. Scott Buhrman, felt stoplists needed to be easily comparable (and honestly represent unification), so he devised a confusing system of upper and lower case nomenclature which denoted whether a stop was independent, duplexed, or unified, and with couplers coded by single letters. One element of this theoretical nomenclature, is unified stops were stated with the name of the parent stop at every pitch it appeared, rather than stating the name on the console stop control. Thus, a four-foot extension of the *Spitzflute 8′* which might say *Forest Flute 4′* on the stop tablet, would be noted as *Spitzflute 4′* in a Buhrman stoplist. While such a specification is of limited use for the researcher, it will make an organ's tonal construction instantly clear to the organbuilder. Editor Buhrman makes a prefatory note in this specification:

> It was with reluctance that the very unusual specification-form submitted by the Architect was abandoned as being too complicated to furnish ready reference in comparison with the world's other great organs.

The stoplist below will follow the original *TAO* presentation in principle, but without the multiple changes in font size. Parent or independent ranks remain in upper case, all borrowed and unified stops are in mixed case, and the same number-lettering system is used to indicate the parent rank and division of origin. Couplers and controls will be spelled out, as accurately as can be determined from the Buhrman-formatted shorthand, although the implied *Pedal to Great 16′* coupler definitely bears further confirmation.

PEDAL

Unenclosed (7½″, 10″, 20″ wind)

1.	32′	Bourdon	37-G
2.	21⅓′	Quint Bourdon	37-G
3.	16′	DIAPASON	56 pipes
4.	16′	Diapason	35-G
5.	16′	Cone Gamba	41-G
6.	16′	Bourdon	37-G
7.	8′	Diapason	3-P
8.	8′	Bourdon	37-G
9.	4′	Diapason	3-P
10.	16′	Tuba Sonora	46-G
11.	8′	Tuba Sonora	46-G
12.	4′	Tuba Sonora	46-G
13.	2⅔′	Tuba Sonora	46-G
14.	2′	Tuba Sonora	46-G

Chamber 3 (Solo-10″ wind)

15.	32′	Contra Violone	50-G
16.	16′	Dulciana	103-C
17.	16′	Contra Violone	50-G
18.	16′	TIBIA MAJOR	51 pipes
19.	16′	Liebichflöte	82-O
20.	10⅔′	Quint Tibia	18-P
21.	8′	Violone	50-G
22.	8′	Tibia Major	18-P
23.	8′	Lieblichflöte	82-O
24.	6⅖′	Tierce Celeste	133-So
25.	5⅓′	Quint Tibia	18-P
26.	4⅘′	Septieme Celeste	133-So
27.	3⅕′	Seventeenth Celeste	133-So
28.	VII	Grand Cornet	55-G
29.	32′	Bombarde	141-O
30.	16′	Tuba	140-So
31.	16′	Bombarde	55-G
32.	16′	Basset Horn	100-O
33.	16′	Oboe	79-O
34.	8′	Bombard	141-O

GREAT II

Unenclosed (*ranks on 3¾″, remainder on 7½″)

35.	16′	*DIAPASON	61 pipes	
36.	16′	Cone Gamba	41-G	
37.	16′	BOURDON	73 pipes	
38.	8′	GRAND DIAPASON	73 pipes	
39.	8′	*DIAPASON FIRST	61 pipes	
40.	8′	*DIAPASON SECOND	61 pipes	
41.	8′	CONE GAMBA	85 pipes	
42.	8′	FLUTE OUVERTE	61 pipes	
43.	4′	Diapason	38-G	
44.	4′	*OCTAVE	61 pipes	
45.	II	*RAUSCHQUINTE	122 pipes	2⅔′ + 2′
46.	8′	TUBA SONORA	97 pipes	20″ wind

Chamber 2 (7½″ wind)

47.	32′	Contra Violone	50-G
48.	8′	DIAPASON PHONON	61 pipes
49.	8′	HORN DIAPASON	61 pipes
50.	8′	VIOLONE	85 pipes

51.	8′	TIBIA CLAUSA	61 pipes	
52.	8′	FLUTE HARMONIQUE	61 pipes	
53.	4′	FLAUTO TRAVERSO	61 pipes	
54.	III	CORNET MIXTURE	183 pipes	1⅗′, 1⅓′, 1′
55.	VII	GRAND CORNET	427 pipes	separately drawable
56.	8′	Principal	55-G	
57.	5⅓′	Quint	55-G	
58.	4′	Octave	55-G	
59.	3⅕′	Tierce	55-G	
60.	2⅔′	Larigot	55-G	
61.	2⅐′	Septieme	55-G	
62.	2′	Super Octave	55-G	
63.	16′	Trumpet	64-G	
64.	8′	TRUMPET HARMONIC	85 pipes	
65.	4′	Trumpet Harmonic	64-G	
A.	(8′)	Harp	Solo	
B.		Chimes	Solo	

ORCHESTRAL III [originally called Swell]

Chamber 4 (7½″ wind)

66.	16′	CONTRA GAMBA	73 pipes	
67.	8′	GAMBA	73 pipes	
68.	8′	GAMBA CELESTE	73 pipes	
69.	8′	VIOLIN	73 pipes	
70.	8′	VIOLIN VIBRATO	73 pipes	sharp
71.	8′	VIOLIN VIBRATO	73 pipes	flat
72.	8′	VIOLA	73 pipes	
73.	8′	VIOLA CELESTE	73 pipes	
74.	4′	VIOLINA	73 pipes	
75.	2⅔′	NAZARD	73 pipes	
76.	III	STRING MIXTURE	183 pipes	3⅕′, 2⅔′, 2′
77.	16′	Oboe	79-O	
78.	8′	CORNOPEAN	73 pipes	
79.	8′	OBOE	97 pipes	
80.	8′	VOX HUMANA	61 pipes	
81.	4′	Oboe	79-O	
		Tremulant		

Chamber 5 (Duplexed, 7½″)

82.	16′	LIEBLICHFLÖTE	61 pipes	
83.	8′	GEMSHORN	73 pipes	
84.	8′	GEMSHORN CELESTE	73 pipes	
85.	8′	CLARABELLA	80 pipes	
86.	8′	GEDECKT	85 pipes	
87.	8′	QUINTADENA	73 pipes	
88.	5⅓′	Gemshorn	83-O	
89.	4′	Gemshorn	83-O	
90.	4′	Clarabella	85-O	
91.	4′	Gedeckt	86-O	
92.	4′	Quintadena	87-O	
93.	3⅕′	Gemshorn Celeste	84-O	
94.	2⅔′	Clarabella	85-O	
95.	2⅔′	Gedeckt	86-O	
96.	2′	Gedeckt	86-O	
97.	1⅗′	Gemshorn Celeste	84-O	
98.	IV	MIXTURE	244 pipes	
99.	16′	Basset Horn	100-O	
100.	8′	BASSET HORN	73 pipes	
		Tremulant		

CHOIR I

Chamber 6 (6″ wind)

101.	16′	Dulciana	103-C
102.	8′	DIAPASON	61 pipes
103.	8′	DULCIANA	97 pipes
104.	8′	UNDA MARIS	61 pipes
105.	8′	VIOLA D'AMOUR	61 pipes
106.	8′	CONCERT FLUTE	61 pipes
107.	8′	STOPPED FLUTE	61 pipes
108.	4′	Dulciana	103-C
109.	4′	CHIMNEY FLUTE	61 pipes
110.	2′	Dulciana	103-C
111.	1′	Dulciana	103-C
112.	8′	Tuba Sonora	46-G
113.	8′	CLARINET	61 pipes
114.	8′	BASSOON	61 pipes

Chamber 5 (Duplexed from Orchestral, 6″ wind)

115.	16′	Lieblichflöte	82-O
116.	8′	Gemshorn	83-O
117.	8′	Gemshorn Celeste	84-O
118.	8′	Clarabella	85-O
119.	8′	Gedeckt	86-O
120.	8′	Quintadena	87-O
121.	4′	Gemshorn	83-O
122.	4′	Clarabella	85-O
123.	4′	Gedeckt	86-O
124.	4′	Quintadena	87-O
125.	2⅔′	Gedeckt	86-O
126.	2′	Gedeckt	86-O
127.	IV	Mixture	98-O
128.	16′	Basset Horn	100-O
129.	8′	Basset Horn	100-O
		Tremulant	

SOLO IV

Chamber 3 (10″; Tuba, Bomb. 20″ wind)

130.	8′	STENTORPHONE	61 pipes
131.	8′	GRAND VIOL	61 pipes
132.	8′	VIOLE CELESTE	61 pipes
133.	8′	CELESTE MINOR	57 pipes
134.	8′	TIBIA PLENA	73 pipes
135.	8′	DOPPELFLÖTE	73 pipes
136.	4′	Tibia Plena	134-So
137.	4′	Doppelflöte	135-So
138.	VII	Grand Mixture	55-G
139.	16′	Tuba	140-So
140.	8′	TUBA	85 pipes

ATLANTIC CITY HIGH SCHOOL

141.	8′	BOMBARDE	85 pipes
142.	8′	FRENCH HORN	61 pipes
143.	8′	COR ANGLAIS	61 pipes
144.	8′	SAXAPHONE	61 pipes
145.	8′	KINURA	61 pipes
146.	8′	MUSSETTE	61 pipes
147.	4′	Tuba	140-So
C.	(8′)	Harp	61 bars
D.		Chimes	25 tubes
E.	(4′)	Harp	C-So

GALLERY V

Trombone Chorus: *Crescendo 1 expression* (10″ wind)

148.	16′	TROMBONE	92 pipes
149.	8′	TROMBONE	73 pipes
150.	5⅓′	Trombone	148-Trb.
151.	4′	Trombone	149-Trb.
152.	2⅔′	Trombone	148-Trb.

Antiphonal: *Crescendo 1 expression* (6″ wind)

153.	8′	VIOLE SOURDINE	61 pipes
154.	8′	SPITZFLÖTE	85 pipes
155.	8′	FLUTE CELESTE	49 pipes
156.	4′	Spitzflöte	154-Ant.
157.	2⅔′	Spitzflöte	154-Ant.
158.	2′	Spitzflöte	154-Ant.
159.	8′	French Horn	61 pipes
160.	8′	Vox Humana	61 pipes
		Tremulant	

COUPLERS

Great Unison Off	
Orchestral to Great	16′, 8′, 4′
Choir to Great	16′, 8′, 4′
Antiphonal to Great	8′
Pedal to Great	16′
Orchestral to Orchestral	16′, 4′
Orchestral Unison Off	
Choir to Orchestral	16′, 8′, 4′
Great to Orchestral	8′
Solo to Orchestral	8′
Antiphonal to Orchestral	8′
Choir to Choir	16′, 4′
Orchestral to Choir	16′, 8′, 4′
Great to Choir	8′
Solo to Choir	8′
Antiphonal to Choir	8′
Solo to Solo	16′, 4′
Antiphonal to Solo	8′
Pedal to Pedal	8′
Great to Pedal	8′
Orchestral to Pedal	8′, 4′
Choir to Pedal	8′
Solo to Pedal	8′, 4′
Antiphonal to Pedal	8′

COMBINATION PISTONS

Dual:	Ped. 3,	Gr. 3,	Orch. 3,	Choir 3,	Solo, 3,	Gen. 4
Absolute:	6	6	6	6	4	4
Trombone:	1					
Antiphonal:	1					

MANUAL ACCESSORIES

Cancel bar for each division
Stop Cancel [General cancel]
Indicator lights:
- For all dual pistons
- 6 for each Crescendo [expression] pedal
- 7 for General Crescendo pedal stations
- Crescendo pedal coupler
- Tubas, when "on"
- Sforzando

Register Crescendo selectives:
- Diapason
- String
- Flute
- Reed
- General, no 4′ or 16′ couplers
- Full, with couplers

PEDAL ACCESSORIES

Sforzando
Crescendo Coupler (to Orch.)
Pistons:
- 2 for Solo
- 8 manual duplicates [generals]

Crescendos [expression pedals]:
- Great (Box 2)
- Orchestral (Box 4)
- Solo and Pedal (Box 3)
- Antiphonal [gallery] (Box 1)
- Register Crescendo

BLOWERS

7½″ hp Kinetic
15 hp Kinetic

Pipework by Midmer-Losh, except: *Saxophone, Kinura, Mussette* made and voiced by Anton Gottfried.
Harp and *Chimes* by Mayland.

General tally: 72 voices, 86 ranks, 165 stops (90 borrows), 5,774 pipes.

ESSAY BY SCOT HUNTINGTON

The High School Organ

IN SPITE OF AN EXPERIMENTAL LODGE INSTRUMENT WHICH preceded it, the Atlantic City High School Auditorium was the first broad canvas Senator Richards had to test his revolutionary tonal ideas. The 2,200-seat room was large by public school standards. The organ was divided in large chambers on either side of the ample stage, with the famed *Trombone Chorus* sailing forth from the rear gallery. The organ was constructed in four stages across two contracts, and when completed was the largest organ installed in a public school in the country. Preceding the colossal Boardwalk Hall instrument by eight years, the High School instrument was in many ways a practice run for the big organ to yet come. Richards' distaste for unification was evident, and except for the bold mutation chorus of trombones, was limited to minor soft registers. Until relatively recent times, no one seemed to mind the out-of-tuneness inherent in borrowing equal-tempered mutation pitches, although the Senator may have been the first to realize a third-sounding rank borrowed from a flat-tuned celeste would be less horrifically out of tune than one borrowed from a unison (M.P. Möller, a friend of the Senator, would adopt the practice in the Swell *Cornet* mixtures of large organs from the 1920s, occasionally throwing in an off-unison borrow of the *Quintadena* for good measure).

The Senator's rise to fame as an "organ expert" began locally, but quickly became a national sensation due largely to the fame of the High School organ, preceding William Barnes and his octet of organ-opinion books by a decade. He found a willing outlet for his own organ opinion pieces in T. Scott Buhrman, the somewhat eccentric editor of *The American Organist*, the most influential of the American organ publications of its day. At a time when the organ as symphony orchestra was the prevailing national style, Emerson Richards realized the baroque organ, or more accurately the properly scaled choruses of classically-voiced principal-type stops needed to be the backbone of any organ–even one of symphonic aspirations.

Although he later found a sympathetic compatriot in G. Donald Harrison and the "clarified ensemble" movement of the 1930s, Emerson Richards and his ideas of ensemble were like a giant storming out of the wilderness when this organ debuted in 1924. With an editor willing to print anything he penned; Senator Richards quickly became the most influential voice for organ reform in the United States during the second half of the 1920s. By the time he began writing articles laying out plans for the world's largest organ circa 1928, he had established an avidly interested if as yet unconvinced audience for his revolutionary ideas. The groundwork for the first Organ Reform of the 1930s and its acolytes G. Donald Harrison, Richard Whitelegg, and James Jamison were laid by Emerson Richards in the 1920s, and arguably that reform begins with this organ, and something producing tangible results people could hear.

Although Richards was firmly committed to modern electric action as produced by the best American builders and espoused an eclectic tonal approach to organbuilding, his work which produced the first organ reform with Baroque organs as an initial wave, inadvertently paved the way for the post-War *Orgelbewegung* second wave of reform in the United States and its rediscovery of tracker action, ultra-low wind pressure, exaggerated speech characteristics, and functionally-exposed or encased organs. While the Senator died in 1963, he lived long enough to see this second reform hit its stride in the landmark Flentrop installed in Harvard's Busch-Reisinger museum and the rise of tracker-building schools in Boston, Texas, and Canada. He would surely have been horrified and would have regarded everything that characterized these organs as *avante guard,* as "defects".

While Senator Richards had visited a number of the most famous antique organs of Europe, it was the blazing fire and brimstone diapason choruses of Edmond Schulze which Emerson heard in the large organ at Armley which most captured his attention: high-tin metal content with thick walls, 2/7 mouth width, halving roughly on the 17th note, but more importantly with straight-line scaling (all ranks of a chorus being the same scale), on the "ideal" pressure of 3¾" pressure with low cut ups and essentially open-toed voicing, i.e. pushing the pipes as hard as the cut-ups will bear. The result is loud, hard, bright, silvery, tone–we would describe pipes and choruses of such intensity as "ringing" the room. Where the power of the traditional English organ lay with its reeds, the German-born Schulze introduced to England the Germanic concept of power from choruses of principals, with the reeds providing color rather than sheer volume. Richards introduced such powerful "Schulze" choruses in his significant projects, although in every instance there were those who contended the instruments as a whole were "louder than necessary".

In his signature public organ projects in Atlantic City–the High School, Ballroom, and Civic Auditorium–all were built upon diapason chorus fundaments. They were conceived as "concert" organs in the British tradition of the grand Town Hall organ, although in their respective styles the trio both contrasted and complimented each other: quasi-symphonic concert organ, civic arena-style symphonic theatre organ, colossal eclectic civic-style classical concert organ.

Senator Richards unveiled the organ to the broader public in an extremely detailed ten-page article in the July 1924 issue of *The American Organist.* It was typically self-congratulatory, but Richards took care to develop for the reader, the theories behind this organ of experiments, both tonal and mechanical. The primary concern for Richards was the development of a great family of Diapason tone, including harmonic compound stops for clarity and brilliance.

ATLANTIC CITY HIGH SCHOOL

If an organ could only have one Diapason, he opined it should be the leathered Hope-Jones variety with its development of fundamental and the lower harmonics, for power and nobility of tone. However, he cautioned that it did not lend itself for chorus development, for which one needed to incorporate harmonically-rich diapason pipework voiced on low pressure for silvery transparency of tone rather than fundamental power. The High School organ had the first such fully developed diapason ensemble as its tonal backbone to have been built thus far in the 20th century. Richards went on to develop this idea to an even more developed theoretical degree in the St. Mark's antiphonal division. By the time he got to the convention organ, he could apply what he learned from his previous experiments with diapason ensembles, to a canvas developed to the largest of cathedral proportions.

The "reed mixture" was another of his grand ideas doubted by everyone around him, but which he felt produced a thrilling ensemble hitherto unknown in modern organbuilding. It would be interesting to know the sensitivity of the Senator's hearing profile, just as it would G. Donald Harrison's, as both men seemed to have a singular acuity into the range of 15,000 hertz and higher, and a special interest in the harmonic development of tone. The Senator was sensitive to an especially prominent fifth partial in *Tromba* tone, and therefore developed the theory that such dark-toned reeds when used at harmonic pitches would both corroborate the harmonic structure of the unison pitches but disappear into the ensemble in the way off-unison diapason ranks meld into a cohesive chorus sounding as one brilliant voice.

The High School introduced triple-length resonators in its singularly commanding *Tuba Sonora*, unenclosed, on 20″ pressure. Combined with extremely heavy walls and high pressure, the double harmonic-length pipes carried the power and tone of the mid-range through to the top pipe of the eight-foot without flue trebles. The desired effect was to produce power and clarity of reed tone in the naturally weak treble range which could balance the strength of the bass register. The Senator described the tone as "ringing and jubilant", and it required the entire diapason chorus to accompany it, and could stand against full organ.

The Senator was equally mindful of the organ's accompanimental role when performing with the school chorus and orchestra. He also had a special fondness for orchestral effects, especially for massed string tone and imitative orchestral reeds, of which the organ was luxuriously appointed with both. Anton Gottfried was celebrated throughout the 20's for his signature ranks of theatrical reed tone, here represented by the *Saxaphone* (*sic*), *Kinura,* and *Musette.* M.P. Möller bought reeds from a number of suppliers until they opened their own reed shop in 1930 and used Gottfried for the same style of signature stops in their line of theatre organs.

Like its Kimball cousin in the nearby Ballroom, this fame of this singularly unique organ was quickly eclipsed by the Convention Hall behemoth. When new, the organ was used with great regularity for school functions and public concerts. Such usage waned quickly after the War, and the high cost of organ maintenance caused a diminishing line-item appropriation in post-War school budgets. The organ slipped into disuse, the victim both of neglect and heavy vandalism. It was ultimately purchased by Adrian Phillips Jr. (son of the driving force for whom the Adrian Phillips Theater is named), when he was visiting Atlantic City and purely by coincidence learned the organ was about to be discarded–buying it on the spot. Young Phillips graduated in the Class of '41, and both took lessons on the organ and played it for school functions. During the instrument's heyday when Phillips would have been intimately acquainted with the Midmer-Losh, it was expanded from 74 to 125 ranks. Mr. Phillips dismantled the organ and removed it to storage in 1974 shortly before the school rebuilt the auditorium and stage house. In 1981 he built a palatial home in Paradise Valley, Arizona with the intention of eventually installing the venerable organ there as soon as finances permitted. An organ hall was added in 2000 and the organ was subsequently refurbished and installed between 2002 and 2006.

Noted theatre organist Lyn Larson was the Project Director and Artistic Consultant in charge of the rebuilding. The bulk of the tonal material was placed on new unit chests to permit respecification. The heart-breaking number of vandalized ranks were replaced with spurious material from Phillip's extensive personal collection of vintage pipework, including repurposed ranks from the Longwood Aeolian acquired in 1984, along with legacy material from Wurlitzer and Robert Morton, giving the organ a decided theatre-organ flexibility it did not originally possess. When completed, the rebuilt organ had 106 ranks, with 34 complete and 11 fragmentary original sets by Midmer-Losh. The famed Schulze chorus of diapasons miraculously remained intact. The dilapidated console was rebuilt with solid-state control equipment by Ken Chrome. After Phillips' untimely death, the property was sold to settle the estate, and the organ was removed in January 2019. It is now in climate-controlled storage awaiting a new home, and is in the possession of his son, Adrian Phillips III. This unique instrument can be heard in a Jelani Eddington CD recorded shortly after the organ's completion in 2006.

See console photo on page 159.

For further information, visit the O.H.S. database:
https://pipeorgandatabase.org/organ/60037

BRYN ATHYN CATHEDRAL

BRYN ATHYN CATHEDRAL OF THE NEW JERUSALEM

Bryn Athyn, Pennsylvania

KEGG PIPE ORGAN BUILDERS, 2014

Hartville, Ohio

Incorporating two Skinner Organ Co. instruments:
Organ No. 574, 1926 – Monumental Church, Episcopal, Richmond, Virginia: Skinner Engineering Dept. scale sheets have limited data annotations.
Organ No. 682, 1928 – Church of the Epiphany, Episcopal, Danville, Virginia [Westfield built]: limited Skinner Engineering Dept. material extant.
SOURCES: Charles Kegg; Skinner factory documents with appreciation to Allen Kinzey; *O.H.S. Handbook, 2001, North Carolina.*

Bold indicates new stops by Kegg Organbuilders.
Italics indicates notations from archival factory documents.

Pitch	Stop	#574	#682	Notes
GREAT 61 notes				
16′	Bourdon (Ped.)	X		*17-pipe extension to top of compass*
16′	**Violone**			*New*
8′	First Diapason	X		*Great Sc. 43 (165 mm), linen lead*
8′	Second Diapason		X	*Great, linen lead*
8′	Clarabella	X		*Great Sc.#2, open wood*
8′	**Gamba**			*New, extension of Violone*
4′	Octave	X		*Great, Sc. 58 (93 mm)*
4′	Harmonic Flute		X	*Choir Orchestral Flute 8′, repitched*
2′	Fifteenth		X	*Swell Principal 4′ repitched*
8′	Tuba (CH)			
8′	**Trumpet**			*New*
8′	French Horn			*Legacy Skinner pipework from Nelson Barden collection*
	Tremolo			
	Chimes			
SWELL 73 notes				
16′	Bourdon	X		*Swell Sc. #2, wood*
8′	Diapason	X		*Swell Sc. 46 (143 mm)*
8′	Gedeckt	X		*Swell Sc.#2, wood*
8′	Salicional	X		*Swell Sc. 64 (66 mm)*
8′	Voix Celeste	X		*Swell Sc. 64, full compass, tuned sharp*
8′	Flauto Dolce	X		*Swell*
8′	Flute Celeste	X		*Swell tenor-c, tuned sharp*
4′	Octave	X		*Swell*
4′	Flute Triangulare	X		*Swell, wood, Sc. "common"*
V	Mixture	X		*Swell "English Chorus" A-12, see Notes*
16′	**Waldhorn**			*New*
8′	Cornopean	X		*Swell*
8′	Flügel Horn	X		*Swell*
8′	Vox Humana	X		*Swell*
	Tremolo			
16	Swell			
4	Swell			
	Swell Unison Off			
CHOIR 73 notes				
8′	Diapason		X	*Swell, linen lead*
8′	Concert Flute	X		*Choir Sc. #1, wood*
8′	Dulciana	X		*Choir Sc. 56 (83 mm)*
8′	Unda Maris GG		X	*Choir Dulciana 8′, now tuned as sharp celeste*
4′	Flute d'Amour		X	*Choir, wood*
2′	Piccolo	X		*Choir Flute 4′ re-pitched, harmonic*
8′	English Horn	X		*Choir, flat-top resonator style*
8′	Clarinet		X	*Choir*
	Tremolo			
8′	**Tuba**			*New, Skinner style*
	Harp			*Aeolian Co.*
16	Choir			
4	Choir			
	Choir Unison Off			
CELESTIAL 73 notes				
8′	Gedeckt		X	*Swell*
8′	**Gross Gamba**			*New*
8′	**Gamba Celeste**			*New*
8′	Echo Salicional		X	*Swell "soft because no Flauto Dolce"*
8′	Voix Celeste GG		X	*Swell, originally t.c., tuned sharp*
4′	**Flauto Mirabilis**			*New, see Essay*
4′	Flute		X	*Extension of Gedeckt*
8′	**Tuba Mirabilis**			*New, Willis style*
8′	Vox Humana		X	*Swell*
	Tremolo			
	Tremolo on 2nd touch			
8′	Tuba (CH)			
8′	French Horn (GT)			
	Harp (CH)			
	Deagan Tower Chimes			
16	Celestial			
4	Celestial			
	Celestial Unison Off			
PEDAL				
32′	**Bourdon**			*New 1-12, wood, extension of Bourdon 16′*
16′	Diapason	X		*52″ x 56″, wood*
16′	Violone (GT)			
16′	Bourdon	X		*Sc. #2, wood*
16′	Soft Bourdon (SW)		X	
8′	Octave			*Extension of Diapason*
8′	'Cello (GT)			
8′	Flute	X		*Extension of Bourdon*
8′	Still Gedeckt (SW)		X	
16′	**Tuba** (CH)			*New, 1-12 extension of Choir Tuba*
16′	Waldhorn (SW)			

COUPLERS

Swell to Great	16	Swell to Choir	8
Swell to Great	8	Swell to Choir	4
Swell to Great	4	Celestial to Choir	8
Choir to Great	16	Great to Pedal	8
Choir to Great	8	Great to Pedal	4
Choir to Great	4	Swell to Pedal	8
Celestial to Great	16	Swell to Pedal	4
Celestial to Great	8	Choir to Pedal	8
Celestial to Great	4	Choir to Pedal	4
Celestial to Swell	8	Celestial to Pedal	8
Swell to Choir	16	Celestial to Pedal	4

Great/Choir Transfer (including keys, pistons, and couplers)
All Swells to Swell
Harp Soft
Harp Dampers Off
Pedal Divide

CONSOLE CONTROLS

COMBINATION PISTONS (40 levels per User, unlimited Users)

Great 1-8	Pedal 1-4	Set	Clear
Swell 1-8	Couplers 1-2	Range	Undo
Choir 1-8	General 1-20	Next (7)	Memory Up
Celestial 1-8	Cancel	Previous (3)	Memory Down

All Divisionals NEXT (with indicator lamp)
Pedal added to Great pistons (with indicator lamp)
Pedal added to Swell pistons (with indicator lamp)

REVERSIBLES

Great to Pedal
Swell to Pedal
Choir to Pedal
Celestial to Pedal
32′ Bourdon
Sforzando (programmable)

ACCESSORIES

Swell expression pedal
Great expression pedal
Choir expression pedal
Celestial expression pedal
Crescendo pedal (Four-memory programmable)
Bench adjustable by crank
Numeric Crescendo indicator
Sforzando indicator lamp
Integral performance recording system
LED lighting (warm white)

WIND PRESSURES

Great 6″	(152 mm)	French Horn 10″	(253 mm)
Swell 6″	(152 mm)	Tuba 10″	(253 mm)
Choir 6″	(152 mm)	Gross Gamba & Celeste 10″	(253 mm)
Celestial 6″	(152 mm)	Flauto Mirabilis 10″	(253 mm)
Pedal 6″	(152 mm)	Tuba Mirabilis 20″	(506 mm)

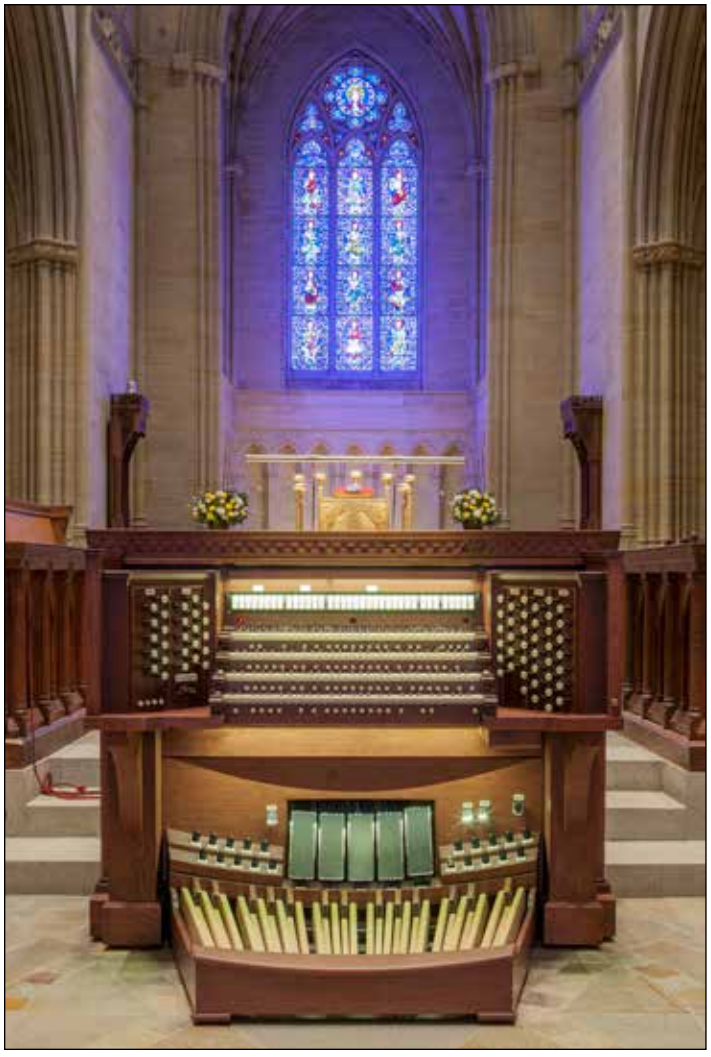
NOTES

Swell Mixture 5 Rks. A – 12 "Willis"
SOURCE: Skinner Organ Company mixture book

C – $e^{♮0}$	2	1⅓	1	⅔	½	17 notes
$f^{♮0}$ – $d^{♯1}$	2⅔	2	1⅓	1	⅔	11 notes
e^{1} – f^{2}	4	2⅔	2	1⅓	1	14 notes
$f^{♯2}$ – c^{3}	5⅓	4	2⅔	2	1⅓	7 notes
$c^{♯3}$ – c^{4}	8	5⅓	4	2⅔	2	12 notes

Unisons 1⅞″ (49 mm) at 2′ C (Sc. 72 – sc. 48 @ 8′ C)
Quints 1⅝″ (41 mm) at 2′ C (Sc. 75 – sc. 51 @ 8′ C)

Console: New, drawknob, Kegg 2014. Carvings draw inspiration from the pulpit.
Compass: 61-note manuals, 32-note pedals, A.G.O. concave and radiating
Pitch: A440, equal temperament
Control System: *IOTI Virtuoso*
Blowers: Main – *Zephyr* 7.5 hp 11″ static; Celestial – *Ventus* 1 hp 12″ static; *Ventus* booster 1 hp 12″ static
Project Contributors: Organ Supply Industries, A.R. Schopp's Sons, Syndyne, Sean O'Donnell, William T. Pugh



BRYN ATHYN CATHEDRAL

ESSAY BY CHARLES KEGG

THE BRYN ATHYN CATHEDRAL HAS A FASCINATING culture. It is much more than just the structures, but as that would take far more room than is available here, I will concentrate on the building and organs, and encourage readers to study further this most interesting place and people.

The main Cathedral building was built between 1913 and 1919. It started as a Cram design. Differences of opinion between Cram and patron John Pitcairn Jr. caused the design process to be taken over completely by John Pitcairn and his son Raymond. The two houses you see next to the Cathedral are the homes of the Pitcairn's, father and son. They were of means as John was President of Pittsburgh Plate Glass, now PPG. Prior to construction, many major parts of the Cathedral building were rendered in large scale models to judge proportions and shadows. During construction, some sections were actually built in plaster and rendered full-scale in-situ before being approved for final execution in stone. The building is constructed stone-on-stone without steel. To this day, the Cathedral employs a full-time stone carver/mason with a shop on-site for Cathedral maintenance.

John Pitcairn's vision was for a medieval-style Gothic Cathedral on a smaller scale. As such buildings go, this one is significantly smaller than would be found in Europe. To make the building feel larger, it makes use of forced perspective. Starting at the rear door and proceeding to the Altar, the building becomes progressively more narrow and shorter, tricking the eye into believing that the room is longer than it is. Part of the theology of the New Church includes the concept that only God is perfect, and the works of man can never be. Thus the building is built with intentional imperfections. For example, the tower is slightly out of square.

Another fascinating subject is the glass in the windows. Pitcairn wanted authentic medieval glass and set up a glass shop to recreate glass-making exactly as it was done in the Middle ages. Vast amounts of glass were made in the Bryn Athyn glass shop, both for the immediate needs of the windows, and also to store for future needs. For decades, Bryn Athyn glass was sought by European glass companies for making accurate repairs in ancient buildings there, as Bryn Athyn glass was the correct color, having used the ancient processes. The Bryn Athyn glass shop closed in the 1940s and they have stopped providing glass to outside groups as supplies are beginning to run low.

The roof and all metal work in the building is Monel Metal, a patented alloy similar to stainless steel. All door hardware and all metalwork in the building is Monel. It is rarely used outside of industry because of high cost. If you look up Monel Metal on Wikipedia, you will find photos of this church. I hope you noticed the key box in the assembly room on the way in. These aren't decorative. They are what you use in the building for access and are, of course, Monel Metal. There are several books in the gift shop that chronicle the construction of the buildings. I recommend them.

The original organ was to have been a large Skinner. As the building approached completion, Mr. Pitcairn was concerned that during WWI, the finest materials might not be available for the large design. As an interim solution, the Skinner company built Opus 291 in 1919, a seven-rank unit organ. This "interim" organ served until 1974 when Schlicker built a three-manual tracker located deep in the chamber with a seven-stop Antiphonal. This organ fell into disrepair and around 2012, a four-manual electronic was installed in the gallery with a second full complement of speakers surrounding the entombed Schlicker. Shortly after this, Frederick Haas approached the church offering to provide them a restored Skinner organ. The result is what you see before you.

When we were asked by Mr. Haas to execute the Bryn Athyn organ, I was excited and apprehensive. This kind of project attracts more than its share of armchair-organbuilder commentary. Eventually, I realized that I must proceed according to my own principles. The organ you see here is the result of those convictions, tempered by the requirements of several consultants.

This project came with two conditions. The case would not be built by us, but by a local company with whom the church had previously worked. Also, the tonal finishing would be done by Anthony Nichols and Daniel Angerstein. I accepted these conditions and we began. During the tonal finishing, conditions evolved, and I took control of the process, overseeing the work being done by Angerstein and Nichols.

The new instrument was to be built around two organs already purchased prior to our involvement. These were Skinner Organ Company Organ No. 574 & 682, both small three-manual instruments. Curiously, for our purposes the two were remarkably complimentary. For example, one had a *Clarinet* in its diminutive four-stop Choir division and the other had an *English Horn* in its equally-tiny Choir. One had a large twelve-stop Swell with duplexing of four stops to the Great, while interestingly, the smaller organ had a Great and Swell which were completely independent. We were able to put together a specification which used almost the entirety of the available tonal resources. The accompanying specification charts the source of each stop. With the exception of the *Tuba Mirabilis* and *Flauto Mirabilis*, all new work was copied from existing Skinner instruments of the same era. We did our best to design and fit the new work in such a way that it appears to be vintage. I have been asked if the Celestial *Gross Gamba* ranks are historic. (They are not.) I like such questions.

The *Flauto Mirabilis* was originally intended to be a painstaking replica of the Wanamaker Organ's legendary *Clear Flute*, here placed on 20″ pressure. At the suggestion of Peter Conte, I pulled the scale back a bit in the 4′ and 2′ range to make it more useful. We also pitched it at 4′ to bring the best range of the stop toward the center of the keyboard. I believe this stop was a great success. Unfortunately, after a year, the music staff decided it was too loud for use in church services. As church policy does not permit the use of the organ for concert work, I agreed to replace the stop with a large-scale metal harmonic flute on 10″ pressure.

The heraldic *Tuba Mirabilis* on 20″ pressure is based on historic Willis models and is hooded. The Choir *Tuba* is based on Skinner examples from the mid-late 1920s. More lyric than the Mirabilis, it is on 10″ pressure.

The Swell is composed entirely from No. 574, with the addition of a sixteen-foot *Waldhorn* – a stylistic reproduction built by A.R. Schopp's Sons. The only *Mixture* in the organ appears here, and is an early Willis style–one of the specific formulas Henry Willis III shared with Ernest Skinner. It is

more aggressive than one might expect. We made no changes to this or any other original stops beyond basic restoration. This *Mixture* appears not to have been altered from its original state.

Significant Great/Choir additions are the vintage Skinner *French Horn* and a new Great *Trumpet*. It was my desire to add a *French Trumpet* to the Swell as was found in larger Skinner instruments of the day. There was physically no room for even one more stop in the Swell, so this stop found its way to the Great. AIO member Sean O'Donnell provided and restored the *Harp* built by the Aeolian Company.

During the planning of the organ, there was a desire to make use of the remaining No. 682 Swell stops as an Echo division. After much consideration, it found a home in a newly-built chamber in the unused bell-ringing chamber of the central tower, situated immediately above the ceiling of the lantern. It is difficult to see, but the tone opening is directly over the chandelier. Once in this position, the Echo was renamed Celestial as a reflection of the New Church theology. It then grew into something of a Solo division and includes a set of Deagan Tower Chimes actually installed inside the building and placed within the same chamber. And no, this wasn't my idea, but I was happy to do it. The strikers of the Deagan chimes were restored by AIO member Bill Pugh. There is an HVAC system for this chamber that tracks the temperature swings of the main chamber and adjusts the temperature in the Celestial to keep the divisions in tune.

The new Kegg console is in the mature Skinner style, and the design of its casework reflects elements embellishing the elegant pulpit. The attentive observer will notice the church mouse, in cassock and surplus, peeking out from behind the music rack.

ORGAN SOURCES

Skinner Organ Company, Boston, Massachusetts
Organ No. 574, "finished" May 3, 1926
Monumental Episcopal Church, Richmond, Va.
SOURCE: *Skinner Engineering Dept. files, appreciation to Allen Kinzey*

GREAT 61 pipes
16′ Bourdon
8′ Diapason
8′ Clarabella
4′ Octave
8′ Flauto Dolce (SW)
4′ Flute (SW)
8′ Cornopean (SW)
Chimes (console preparation)

SWELL 73 notes
16′ Bourdon
8′ Diapason
8′ Gedeckt
8′ Salicional
8′ Voix Celeste
8′ Flauto Dolce
8′ Flute Celeste (t.c.)
4′ Flute Triangulaire
Mixture (English Chorus) 5 rks.
8′ Cornopean
8′ Flügel Horn
8′ Vox Humana
Tremolo

CHOIR 73 notes
8′ Concert Flute
8′ Dulciana
8′ Flute
8′ Clarinet
Tremolo

PEDAL
16′ Diapason
16′ Bourdon
16′ Echo Lieblich (SW)
8′ Octave (ext.)
8′ Gedeckt (ext.)
8′ Still Gedeckt (SW)

COUPLERS
Great 4
Swell to Great 16, 8, 4
Choir to Great 16, 8, 4
Swell to Swell 16, 4
Choir to Choir 16, 4
Swell to Choir 16, 8, 4
Great, Swell, Choir to Pedal 8
Swell to Pedal 4

Skinner Organ Company, Boston, Massachusetts (Westfield plant)
Organ No. 682, April 2, 1927
Church of the Epiphany, Danville, Va.
SOURCE: *O.H.S. Convention Handbook 2001, North Carolina; Skinner Engineering files missing*

GREAT 61 pipes
8′ Diapason
8′ Clarabella
4′ Principal
Chimes (prepared, added 1/12/28)

SWELL 73 notes
16′ Bourdon
8′ Diapason
8′ Rohrflute
8′ Echo Salicional
8′ Voix Celeste (t.c.)
4′ Principal
8′ Trumpet
8′ Vox Humana
Tremolo

CHOIR 73 notes
8′ Orchestral Flute
8′ Dulciana
4′ Flute d'Amour
8′ English Horn
Tremolo

PEDAL
16′ Diapason
16′ Bourdon (SW)
8′ Octave (ext.)
8′ Gedeckt (SW)

COUPLERS
Identical to No. 574, without Great 4

CHRIST CHURCH EPISCOPAL

C.B. FISK, OPUS 150, 2018

Christ Church Episcopal
Philadelphia, Pennsylvania

GREAT, 61 NOTES, MANUAL II

1. Prestant 16′
2. Octave 8′
3. Gambe 8′ *
4. Harmonic Flute 8′ *
5. Bourdon 8′
6. Octave 4′
7. Spire Flute 4′ *
8. Twelfth 2⅔′
9. Fifteenth 2′
10. Mixture IV-VI (1⅓′) **
11. French Trumpet 8′ *
12. German Trumpet 8′

**Stops in Upper Great*

***The 5⅓′ sounds only when the Prestant 16′ is drawn.*

CHAIRE, 61 NOTES, MANUAL I

13. Prestant 8′ ***
14. Gedackt 8′
15. Quintadehn 8′
16. Octave 4′
17. Rohr Flute 4′
18. Quinte 2⅔′
19. Superoctave 2′
20. Block Flute 2′
21. Terz 1⅗′
22. Mixture IV(1′)
23. Dulzian 16′
24. Cremona 8′

****Bass pipes from No. 1*

SWELL, 61 NOTES ,MANUAL III, ENCLOSED

25. Bourdon 16′
26. Violin Diapason 8′
27. Viole de gambe 8′
28. Voix céleste 8′
29. Corde Nuit 8′
30. Dulciane 4′
31. Flûte octaviante 4′
32. Nasard 2⅔′
33. Octavin 2′
34. Tierce 1⅗′
35. Plein jeu IV (2′)
36. Bombarde 16′
37. Trompette 8′
38. Hautbois 8′

PEDAL, 32 NOTES

39.	Resultant 32′	From No. 43 or No. 40
40.	Open Bass 16′	wood, open
41.	Prestant 16′	from No. 1
42.	Violonbasse 16′	wood & metal, open
43.	Soubasse 16′	wood, stopped
44.	Octave 8′	metal, open
45.	Violoncelle 8′	ext. No. 42
46.	Bourdon 8′	ext. No. 43
47.	Octave 4′	metal, open
48.	Posaune 16′	metal, reed
49.	Trommet 8′	ext. No. 4

COUPLERS

Chaire to Great	Swell to Pedal 4′
Great to Pedal	Wind Stabilizer
Swell to Great	General Tremulant
Chaire to Pedal	Chaire Tremblant Doux
Swell to Chaire	Balanced Swell Pedal
Swell to Pedal	Cymbelstern

Key Action: Direct mechanical (tracker), except for the largest pipes of the organ.

Stop Action: Solenoids, electrically controlled SSOS combination action.

Casework: A main case reusing the historic Erben case, and a Chaire case on the gallery railing, designed to harmonize with the main case.

Key Desk: Detached from the main case, three manuals and pedal; manuals 61 keys C-c^4, naturals covered with cow bone, sharps of ebony; Fisk pedalboard 32 keys C-g^1.

Front Pipes: Front pipes are made of polished hammered tin.

PHOTO: Dana Sigall

CHRIST CHURCH EPISCOPAL

PHILADELPHIA

GREAT | W.P. 2¼″		**Pipes**		**C**	**c⁰**	**c¹**	**c²**	**c³**	**c⁴**	**Conception-precedent**
1. Prestant 16′	*Wood*	6		251 x 197	201 x 158 (F)	---	---	---	---	New scale; C-F wood
	BurTin façade	25		192 (F♯)	147	86	---	---	---	Laukhuff façade: F♯–f♯¹
	HaSpot interior	30		---	---	---	49	31	19.5	
2. Octave 8′	*BurTin façade*	7		160	---	---	---	---	---	55G8 scale
	HaTin interior	54		---	91	51	33	21.5	13.5	Laukhuff façade: C-F♯
3. Gambe 8′	*Spot*	12		103	62	37	23	14	8.3	140V8S scale; Cavaillé-Coll
	HaTin	49								Salicional "5" Scale, *Progression = 7½*
4. Harmonic Flute 8′	*Spot*	12		135	77	57	42	---	---	New scale, extension of 145G8FH,
	HaTin	49		---	---	48.9 (f♯¹)	50.2 (g¹)	30	18	harmonic @ g¹
5. Bourdon 8′	*Wood*	12		140 x 110	90 x 70 (B)	---	---	---	---	136G8F scale; chimneys
	HaLead	49		---	87	54	34	21.5	---	*Progression = 6.5;* open trebles @ g♯³
				---	---	---	16 (g³)	17.5 (g♯³)	15	
6. Octave 4′	*HaTin*	61		85	51.5	30	19.7	13.3	7.5	55G4 scale; 4/17 M.W.
7. Spire Flute 4′	*HaLead*	61		90	55	36	25	17.5	12	55G8F scale, transposed;
										5:6 taper @ C graded to 2:3 taper @ c²
8. Twelfth 2⅔′	*HaTin*	61		60	35	20.7	13.1	7.7	4.5	119G12 scale
9. Fifteenth 2′	*HaTin*	61		46.5	28.6	17.8	11.2	7	4.1	141G2 scale
10. Mixture IV-VI	*HaTin*	---	1′	27	16.7	10.5	6.6	4.1	---	←1′, also doubled 1⅓′rank
			1⅓′	25	15.5	11.8	7.7	4.0	---	Scales from 55/141GM
			C	*1⅓*	*1*	*½*	*⅓*			Composition based on 141GM
			c⁰	*1⅓*	*1*	*⅔*	*½*			
			f♯⁰	*2⅔*	*1⅓*	*1*	*⅔*	*½*		
			c¹	*2⅔*	*2*	*1⅓*	*1*	*⅔*		
			f♯¹	*5⅓**	*2⅔*	*2*	*1⅓*	*1⅓*	*1*	
			c²	*5⅓**	*4*	*2⅔*	*2*	*1⅓*	*1⅓*	
			c♯³	*5⅓**	*4*	*2⅔*	*2*			
			f♯³	*5⅓**	*4*	*2⅔*				
			**This rank sounds only when the Prestant 16′ is also drawn.*							
11. French Trumpet 8′		61		125	99	79	62	50	to f³	Cavaillé -Coll "E3" scale
12. German Trumpet 8′		61		124	96	75	58	45	to f³	72G8T, Tellingstedt-Brunner (1642)

CHAIRE | W.P. 2¼″		**Pipes**		**C**	**c⁰**	**c¹**	**c²**	**c³**	**c⁴**	**Conception-precedent**
13. Prestant 8′	*Wood interior*	6		97 x 97	76 x 76 (F)	---	---	---	---	W.T. C=15, F=12
	HaTin 95% façade	29		102 (F♯)	77	45	29.5 (a♯¹)	---		Façade: F♯-a♯¹
	HaTin 95% interior	26		---	---	28.2 (b¹)	27	16.2	9.4	148V8, scales and M.W.
14. Gedackt 8′	*OAK*	49		78 x 63	47 x 38	34 x 26.5	23.5 x 19	17 x 13.5		John Schreiner Op. 7, 8F scale, with
	HaLead	12		8.5	6	4	3	17.5 (c♯³)	12.5	c♯³– c⁴ open and cylindrical
15. Quintadehn 8′	*HaLead*	61		78	47	32.2	20.8	12.8	7.9	72V8S scale, but smaller C, c⁰
16. Octave 4′	*HaLead*	61		72	44	27	16.5	10.5	6.7	55V4 scale, with larger c¹ (Op. 55=25)
17. Rohr Flute 4′	*HaLead*	61		67	41.5	27.6	19	14	9.4	C, c⁰ ~ 62S4F; c¹–c⁴ = 140V4F
					26 (d¹)	25.1 (d♯¹)	12.8 (d³)	13.4 (d♯³)	---	d♯³–c⁴ open and tapered
18. Quinte 2⅔′	*HaLead*	61		31.8	33	19.2	11.3	6.9	4.3	72VQ12; 4/17 MW
					20.1 (B)					C–B = 1⅓′ pitch, as at Op. 72
19. Superoctave 2′	*HaSpot*	61		43	24	14	10	7	3.8	55V2 scale, with larger C (Op. 55=40)
20. Block Flute 2′	*HaLead*	61		55	32.7	20.5	16.1	16.9 (f¹)	---	72B2F scale, C–f¹ chimneys, 4/17 M.W.
					---	---	19.7 (f♯¹)	10.8	7	f♯¹–c⁴ open, cylindrical
21. Terz 1⅗′	*HaLead*	54		36.6	21.8	12.9	7.8	4.7	3.8 (f³)	72VQ17 scale; 4/17 M.W.
22. Mixture IV	*HaSpot*	---	1′	22	12.2	7.5	5.3	3.7	---	55VM, later adjusted scales
			1⅓′	19	16.3	11.5	8.1	5.7	---	1⅓′ rank only = “Special” scale
			C	*1*	*⅔*	*½*	*⅓*			55VM composition (minus the 8′)
			c⁰	*1⅓*	*1*	*⅔*	*½*			
			c¹	*2*	*1⅓*	*1*	*⅔*			
			f♯¹	*2⅔*	*1*	*1⅓*	*1*			
			c²	*4*	*2⅔*	*2⅔*	*1⅓*			
			c♯³	*4*	*2⅔*	*2*				
			f♯³	*4*	*2⅔*					
23. Dulcian 16′		61		52 (73)	41	33	26	21	17	~ Schnitger, Stade Rückpositiv,
			Blocks	*60*	*53*	*48*	*39*	*32*	*32*	canistered bass
24. Cremona 8′		61		37	33	30	26.5	26.5	---	55V8H, Old West

CHRIST CHURCH EPISCOPAL

PHILADELPHIA

SWELL, *enclosed* | W.P. 2¼"		**Pipes**		**C**	**c⁰**	**c¹**	**c²**	**c³**	**c⁴**	**Conception-precedent**
25. Bourdon 16′	*Wood* *HaLead*	14 47		156x122 ---	100 x 78 (B) 92.6 (d⁰)	96 x 76 (c♯⁰) 63	--- 41	--- 26	--- 16.7	140V16F; C.-C. Bourdon "X" Scale, *Progression* = *6*; no chimneys
26. Violin Diapason 8′	*Spot*	61		145	81	46	30	20	12	55S8 scale; not slotted
27. Viole de gambe 8′	*Spot* *HaTin*	12 49		90	56	34	21	12.9	7.95	C.-C. Gambe "7" scale; *grosse taille*; *Progression* = 7, 4/17 M.W.; ¼ Ø slots
28. Voix céleste 8′	*Spot* *HaTin*	12 49		80	50	31	19	11.4	6.8	C.-C. Gambe "8" scale; *moyenne taille*; *Progression* = 7, 4/17 M.W.; ¼ Ø slots
29. Cor de Nuit 8′	*Wood* *HaLead*	12 49		130x102 ---	83 x 65 (B) 78	--- 52	--- 35 18 (g³)	--- 23.5 18.7 (g♯³)	--- 16	Cavaillé-Coll "H" scale; *Prog. 5½*; c⁰–c⁴ = X140V8F (no chimneys), open & cylindrical from g♯³
30. Dulciane 4′	*HaTin*	61		82	46	28.4	17.2	11	6.4	141S4 scale; not slotted
31. Flûte octaviante 4′	*HaTin*	61		71	54 46 (f♯⁰)	39 47 (g⁰)	24.5	15.5	9.5	141S4FH scale; not slotted, harmonic @ g⁰
32. Nasard 2⅔′	*HaLead*	61 38 (B)		57	42.8	27.3	17.5	11.3	7.1	136V/145S12 scale; C–B with chimneys
33. Octavin 2′	*HaTin*	61		54 38.2 (B)	39	23	14	9	5.5	109/139/140S2FH scale
34. Tierce 1⅗′	*HaLead*	54		50.5	31.8	20	12.5	7.9	6.5 (f³)	136V/145S17 scale
35. Plein jeu IV	*HaTin*	---	2′ 1′ *C* *f♯⁰* *f♯¹* *f♯²* *c♯³*	43 23 *2* *2* *2⅔* *4* *4*	25 14 *1* *1⅓* *2* *2⅔* *2⅔*	15.5 8.5 *⅔* *1* *1⅓* *2* *2*	9.7 5.2 *½* *⅔* *1* *1⅓*	6.2 3.2	3.7 ---	141SM scales; 2′ larger than other ranks; not slotted 139SM composition
36. Bombarde 16′		61		127	99	78	61	48	40	103S16T scale, Cavaillé-Coll "H6″
37. Trompette 8′		61		111	88	70	56	44	---	121S8T scale, Cavaillé-Coll "E5″
38. Hautbois 8′		61		75 43 (b⁰ end of single taper)	57	51	42 40 (e²)	43 48 (f² begin single taper)	40 (f³)	75S8H, 93S8H c¹-f³, ⅞ cut *Bertouneche* shallots; C–b⁰ = C.– C. "G2" Basson, *Taille II* shallots, teardrop openings harmonic @ f² after Douai (Mutin)

PEDAL | W.P. 3″		**Pipes**		**C**	**c^0**	**c^1**	**g^1**	**Conception-precedent**
39. Resultant 32′		---		---	---	---	---	“Smart” resultant, drawing either No. 40 or 43
40. Open Bass 16′	*Wood*	32		300 x 236	180 x 141	107 x 84	80 x 63	Cavaillé-Coll *“Diapason AA”* scale, not slotted
41. Prestant 16′		---		---	---	---	---	From No. 1
42. Violonbasse 16′	*Wood*	25		155 x 155	95x95	58x58	---	New scale, square cross-section
			W.T.	*19*	*11.5*	*7*	---	Audsley Vol. II, p. 470 construction,
	Spot	7		---	---	63 ($c^{\sharp 1}$)	49.7	$c^{\sharp 1}$–g^2 spotted metal; ¼ M.W.
43. Soubasse 16′	*Wood*	32		241 x 189	145 x 114	87.5 x 68.5	64 x 50	OSI #1 Bourdon scale inside depth but with narrower inside widths
44. Octave 8′	*HaLead*	32		157	92.5	57	43	New scale; ¼ M.W. @ C graduated to 4/17 M.W. @ c^1; 5:6 taper
45. Violoncelle 8′	*Spot*	12		---	47.8 ($g^{\sharp 0}$)	40.8	30.8	Extension No. 42
46. Bourdon 8′	*Wood*	12		---	61 x 48 ($g^{\sharp 0}$)	51 x 40	39 x 30.5	Extension No. 43
47. Octave 4′	*HaLead*	32		91	52	32	24	127/133P4 scale
48. Posaune 16′		32		195	142	103	86	~131P16T, 132P16T scale Schnitger-style shallots
49. Trommet 8′		12		---	84 ($g^{\sharp 0}$)	75	63	Extension No. 48

LEGEND

~	Approximate
Bertouneche	Was a famed French supplier of shallots, especially domed, parallel shallots
BurTin	Burnished tin
C.-C.	Cavaillé-Coll
Conception numbers ex. 131P16T	Opus/Division/Stop/Pitch of a legacy example, “X” denotes special scale: example Opus 131, Pedal, 16′ Trombone
Cut	Refers to the width of the shallot cut-away in proportion to the segment of a circle, a factor thereby affecting the depth.
G, P, S, V	Great, Pedal, Swell, Positiv
Grosse taille	Large size
HaLead	Hammered lead
HaSpot	Hammered spotted metal
HaTin	Hammered tin
Moyenne taille	Medium size
Taille II	Shallot size #2
W.P.	Wind pressure
W.T.	Wall thickness
M.W.	Mouth width

Cavaillé-Coll scaling is based on strict mathematical formulas, and is primarily concerned with only two numbers: the starting diameter of low C, and the diameter of C49. What happens in between is straight-line scaling based on a specific halving ratio selected by the builder. Standardized scales are found in once secret factory ledgers and manuscripts that are now becoming more widely disseminated. The starting low-C diameters of various flue and reed stops are referenced by numbers or number-letter combinations, such as *Salicional* “5” or *Gamba* “8”, the larger the number, the smaller the starting diameter. Next, the size of note C49 is chosen by selecting a halving formula, referred to as a *Progression*. Number 8 is the highest, and equals halving on the 17th note. As the *Progression* number gets smaller, the halving ratio increases, or slows down. Therefore, as one selects decreasing *Progression* numbers, the size of note C49 gets larger, and by virtue of the straight line scaling, the treble pipe scales increase. For reed pipes, where the scale progression will be much slower than flue pipes, the reed scales will have lower *Progression* numbers, perhaps as low as “2”, where the C49 resonator would be fully half as large as bass C1. *Diapason* refers to the basic scale patterns for the principal-toned foundation stops, whereas *Diapason normal* referred to the late-nineteenth century standardized pitch of A435.

CHRIST CHURCH EPISCOPAL

ESSAY BY **DAVID C. PIKE**

DATING TO 1744, CHRIST CHURCH IN PHILADELPHIA IS ONE OF the finest Georgian structures in America. It hosted members of the Continental Congress during the American Revolution as well as Presidents George Washington and John Adams in the first decade of the newly established Republic. Among early members were Benjamin and Deborah Franklin, Betsy Ross, and several signers of the Declaration of Independence. At the center of the nave's wrap-around West Gallery under an elegant barrel vault, stands a stunning white organ case decorated with fine carvings and a crowning, gilded starburst. The church's organ history begins with a modest imported Prussian instrument installed in 1728 and replaced in 1766 with a 27-stop three-manual organ with an elaborate case (large for the day), built by the German immigrant and Philadelphia organbuilder Phillip Feyring (1730–1767). The history of the present case begins with a large and distinguished three-manual organ by Henry Erben, costing $6,000, which replaced the Feyring in 1837. Interestingly, the organ was designed by the church's organist at the time, John C.B. Standbridge (1800–1871), who later became an important Philadelphia builder in his own right, and either rebuilt or replaced the Erben some years later. The imposing case, which subsequently housed rebuilds by Standbridge, Haskell, and a transplanted Aeolian/Aeolian-Skinner, now encloses C.B. Fisk Opus 150. The new organ adds a Chaire division, designed to harmonize with the historic main case, on the gallery rail. The 49-stop instrument comprises three manuals and 3,095 pipes and is of an eclectic tonal design. The pipes of the manual divisions are voiced on 2¼″ of wind.

It was the architectural and acoustical properties of the space that together suggested the use of a low pressure. In preparation for tonal design, we listened to a variety of musicians performing from different locations in the gallery in order to gain a better understanding of the sanctuary's acoustics. We engaged a flautist, a Baroque oboist, a viola da gambist, and a vocal quartet. We had step ladders for them to climb and staging set up over the old console; we asked them to play and sing from various walkboards inside the former instrument, all to gain insight into how the room supports (or doesn't support) musical sounds from a variety of elevations. Especially telling was the vocal quartet's singing from just behind the gallery railing, on center with their chins right at railing height. We all thought–wow, this organ really ought to have a lightly-winded Positif division on the railing! Elevations of the Great and Swell windchests were directed by our listening as well–including the bi-level Great division with 18th-century chorus ranks traditionally placed at impost height and 19th-century voices higher in the case from where they can engage the barrel vault and "light up" the upper volume of the room efficiently and effectively.

The key to such experimentation is to go into the process with an open mind, looking to discover what is there for the taking. Imposing one's prejudices or predispositions is not part of the formula. Christ Church the building, suggested to us in no uncertain terms, an organ whose sounds combine character, warmth, articulation, transparency, and elegance. While it was not the easiest of decisions to make, voicing the pipes on 2¼″ [57mm] water column seemed the most right and gallant route to take. The tones of Charles Fisk's celebrated Opus 55 in Old West Church, Boston, reminded us of what is possible at said wind pressure.

Mechanically, we wanted to create a light, sensitive, and responsive key action–the type that encourages the player to listen and explore. The stop action would need to be electrically controlled and partnered with a reliable solid-state combination system for use in liturgies and recitals. Enter Richard Houghten and Vlady Vaculik, to perform their electrical magic. A genuine Swell box offering a wide dynamic range and a well-designed shade mechanism would be necessities for providing suitable, user-friendly volume control in both choral accompaniment and repertoire.

Every sound-producing element of the new organ is in the sanctuary space, forward of a newly-constructed masonry wall separating gallery from tower. There is no longer an impenetrable jumble of pipes and sub-quality mega-organ parts residing in the tower behind. Ben Franklin, the tower's designer, has no doubt breathed a sigh of relief.

And apropos Mr. Franklin, the historical importance of the building meant that multiple layers of governance needed to sign off on the addition of a division on the gallery railing. Initially we were told it was an impossibility, but in the end, education, persistence, and honest dialogue convinced the experts and consultants of the wisdom of the Chaire. Together with the carefully designed penetrations of the rebuilt gallery railing, the Chaire makes perfect sense–architecturally, acoustically, and organically.

It has completed the Holy Trinity of organ divisions (Great as Father, Chaire as Son, Swell as Holy Spirit), brought the organ closer to the people (Christ among us), and has in the end proven indispensable to the success of this organ.

The 1766 Philip Feyring organ, from an early 19th-century hand-colored engraving by W. Mason.

Stereograph by James Cremer, Philadelphia, 1873
of the Henry Erben organ, 1837.
FROM THE COLLECTION OF Stephen L. Pinel.

FREDERICK HAAS RESIDENCE

FREDERICK HAAS RESIDENCE

Philadelphia, Pennsylvania
Renovated and Relocated 2016 by Sean O'Donnell

SKINNER ORGAN CO.

Organ No. 617 (1926), 617-A (1929)
Boston, Massachusetts

Pitch	Stop	Origin	Exp.	Added
SOLO-GREAT - Manual I				
16	Bourdon	Unit B	Great	
8	Chimney Flute	Unit B	Great	
8	Cello Celeste	Primary 3	Great	
4	Flute	Unit B	Great	
2⅔	Nazard	Unit B	Great	
2	Piccolo	Unit B	Great	
8	Corno d' Amore	Cello + Flute 4 + Naz. 2⅔	Great	
8	Trumpet	Unit C	Great	617-A; 2013
8	French Horn	Primary 3	Great	
8	English Horn	Primary 3	Great	617-A
8	Clarinet	Primary 3	Great	
8	Vox Humana	Primary 3	Great	
4	Clarion	Unit C	Great	617-A
	Tremolo			
	Chimes		Great	
	Xylophone		Great	617-A
	Glock		Great	2013
	Spare			
SOLO-SWELL & ECHO - I				
8	Diapason	Primary 3	Swell	
8	Orchestral Flute	Unit A	Swell	
8	Voix Celeste	Primary 3	Swell	
8	Flute Celeste	Primary 3	Swell	
8	Unda Maris	Unit E	Swell	617-A
4	Flute	Unit A	Swell	
	Tremolo			
	Harp		Swell	
	Celesta		Swell	
8	Cor de Nuit	Primary 5	Echo	617-A
8	Chimney Flute	Primary 5	Echo	617-A
8	Vox Humana	Primary 5	Echo	617-A
	Tremolo			
	Xylophone		unenclosed	
	Spare			
GREAT - Manual II				
16	Bourdon	Unit B	Great	
8	Chimney Flute	Unit B	Great	
8	Cello Celeste	Primary 2	Great	
4	Flute	Unit B	Great	
2⅔	Nazard	Unit B	Great	
2	Piccolo	Unit B	Great	
8	Corno d' Amore	Cello + Flute 4 + Flute 2⅔′	Great	
8	Trumpet	Unit C	Great	617-A; 2013
8	French Horn	Primary 2	Great	
8	English Horn	Primary 2	Great	617-A
8	Clarinet	Primary 2	Great	
8	Vox Humana	Primary 2	Great	
4	Clarion	Unit C	Great	617-A
	Tremolo			
	Chimes		Great	
	Glock		Great	2013
	Spare			
SWELL & ECHO - Manual III				
8	Diapason	Primary 1	Swell	
8	Orchestral Flute	Unit A	Swell	
8	Voix Celeste	Primary 1	Swell	
8	Flute Celeste	Primary 1	Swell	
8	Unda Maris	Unit E	Swell	617-A
4	Flute	Unit A	Swell	
	Tremolo			
	Harp		Swell	
	Celesta		Swell	
8	Cor de Nuit	Primary 4	Echo	617-A
8	Chimney Flute	Primary 4	Echo	617-A
8	Vox Humana	Primary 4	Echo	617-A
	Tremolo			
	Vibraharp		unenclosed	2013
	Spare			
PEDAL				
16	Bourdon	Unit A	Swell	
16	Echo Lieblich	Unit B	Great	
8	Gedeckt	Unit A	Swell	
8	Still Gedeckt	Unit B	Great	
16	Trombone	Unit C	Great	617-A; 2013
16	Bassoon	Unit D	Great	617-A
8	Tromba	Unit C	Great	617-A; 2013
8	Bassoon	Unit D	Great	617-A
	Chimes		Great	
	Tympani		Great	617-A
	Bass Drum		Great	617-A
	Spare			
	Spare			
	Spare			

CONSOLE CONTROLS

COUPLERS

Great	16,4
Swell	16,4
Solo 16,4	

Swell to Great	
Solo to Great	
Swell to Solo	
Swell to Great	16,4
Solo to Great	16,4
Swell to Solo	16,4
Great to Pedal	
Swell to Pedal	
Solo to Pedal	
Great to Pedal	4
Swell to Pedal	4
Solo to Pedal	4

PLAYER

Re-roll
Repeat
Automatic
Semi-Automatic
Ventil

TRAPS *(2013)*

Snare Drum	Sleigh Bells
Tom Tom	Birds
Triangle	Fire Gong
Castanets	Bell
Finger Cymbal	Horn
Tambourine	Train
Chinese Block	

FREDERICK HAAS RESIDENCE

CHAMBER ANALYSIS

Stops in *italics* are derived from the preceding parent rank.
All independent stops are 61 pipes and celestes are 110 pipes, except as noted.

GREAT CHAMBER (*Expression II, Duplex Solo-Great*)

Pitch	Stop	Chest	Notes
16	Bourdon	Unit B	Large Scale, 85 pipes
8	*Chimney Flute*	*Unit B*	Melodia@c25, revoiced 1/10/29
4	*Flute*	*Unit B*	Metal trebles
2⅔	*Nazard*	*Unit B*	
2	*Piccolo*	*Unit B*	617-A eliminated the 1926 1⅗′ extension
8	Cello Celeste	Primary 3	2 ranks, sharp celeste t.c.
8	French Horn	Primary 3	
8	English Horn*	Primary 3	617-A, on 1926 Trumpet toeboard
8	Clarinet	Primary 3	
8	Vox Humana	Primary 3	
8	Trumpet	Unit C	617-A, [1930, No. 745] pipes on new unit chest, 73 pipes. [Replaced 2016 with No. 628 Cornopean] 7½″ wind
4	*Clarion*	*Unit C*	617-A, extension
16	*Trombone (Ped.)*	*Unit C*	617-A, extension
8	*Cornopean (Ped.)*	*Unit C*	2016 extension
16	Pedal Bassoon	Unit D	617-A, the only independent pedal stop
8	*Pedal Bassoon*	*Unit D*	617-A
	Tremolo		
	Chimes		
	Xylophone		617-A
	Glockenspiel		Later addition
	Tympani		617-A
	Bass Drum		617-A

* *in the 1926 instrument, the English Horn was a synthetic derivation*

SWELL CHAMBER (*Expression I, Duplex Solo-Swell*) 5″ pressure

8	Diapason	Primary 3	Sc. 44
8	Flute Celeste	Primary 3	Flauto Dolce, 2 ranks, sharp celeste t.c.
8	Voix Celeste	Primary 3	Salicional, 2 ranks (122 pipes), full-compass sharp celeste, Sc. 64
8	Unda Maris	Unit E	617-A, Sc. 56, 2 ranks, sharp celeste t.c.
8	Orchestral Flute	Unit A	Gedeckt, wood, 97 pipes
4	*Flute*	*Unit A*	
16	*Bourdon (Ped.)*	*Unit A*	Ped. *Echo Lieblich, Still Gedeckt*
	Tremolo		
	Harp		61 bars, t.c. at 8′
	Celesta		Harp at octaves

ECHO CHAMBER (*Duplex Solo-Echo, Swell-Echo*) 5″ pressure

8	Chimney Flute	Primary 5	617-A
8	Cor de Nuit	Primary 5	617-A
8	Vox Humana	Primary 5	617-A
	Tremolo		617-A

UNENCLOSED

8	Vibraharp		Later addition

TRAPS (*later addition toy counter*)

Snare Drum	Tambourine	Bell
Tom Tom	Chinese Block	Horn
Triangle	Sleigh Bells	Train
Castanets	Birds	
Finger Cymbal	Fire Gong	

SOURCE: Factory contracts, courtesy American Organ Archives, appreciation to Bynum Petty, Archivist.

ESSAY BY SEAN O'DONNELL

E.M. SKINNER DEFINED AMERICAN ORGANBUILDING FOR NEARLY half a century with his concept of the "orchestral" organ, with all of the color, expression and nuance of a full symphony orchestra, and with his ingenious array of mechanical devices to facilitate music making.

In the early years of the 20th century, Skinner took this even further, with the development of the Orchestrator. A "player orchestra" with six independent voices, it was the equivalent of a five-manual and pedal organ operated from a perforated paper roll that could play as many notes as the music required. As it pushed "tinker toy technology" to the breaking point, it was a commercial failure, but it led to a simplified player of three independent voice lines, the equivalent of a two-manual and extended pedal organ, prosaically referred to in the contracts simply as "Player Attachment."

While all the bits and pieces of the instrument–the pipes, chests, switches, relays, magnets, and electrical parts–would be instantly recognizable to anyone who has ever worked on a Skinner church organ, a traditional organbuilder or classically-trained organist would find the arrangement of these parts and pieces unusual, if not downright bizarre.

The entire organ is contained in two expression boxes, but rather than the traditional Swell and Great, the pipework is cleverly divided: flues in one box, reeds in the other, with one flue in the reed box, one reed in the flue box, and a unit flute in each.

On the typical two-manual console, all stops are available on both manuals. The expression boxes are labeled Great (reed side) and Swell (flue side). The manuals are identified as Swell and Great on the drawknobs and couplers for organist convenience, but the internal wiring refers to them as Left and Right, based on their positions on the perforated paper roll. These consoles generally had hard-wired, blind combination pistons.

Skinner Opus 617, originally two-manuals and thirteen ranks (with Player Attachment) hails from this Orchestrator lineage. Originally purchased in 1926 by James R. Monroe [known as J.R.] of Monroe Adding Machine fame, both the instrument and the console were substantially enlarged just three years later to three-manuals and twenty ranks, with a capture-action combination running twenty-five

divisional pistons (but no generals) and a very complete set of unison and octave couplers. The original two-manual console became part of Skinner Op. 802, the Palm Beach Studio organ later moved to Birmingham, Alabama.

The organ remains essentially a two-manual, fully duplexed organ, but with one of the duplexes divided. This leaves all of the flues on the Swell (top) manual, while all of the reeds, one flue, and the unit flute are on the Great (middle) manual. The lowest manual, called "Solo," plays all of the stops, but on the drawknobs they are differentiated as "Solo Great" and "Solo Swell." The three stops of the Echo organ play from the Solo and Swell manuals.

Costing $4,800 after the trade-in allowance for the two-manual console, this was a rather extravagant upgrade for the instrument, and Arthur Hudson Marks, worried about "buyer's remorse" on a high profile project, writes:

> This seems to us a very expensive luxury and we do not recommend it.
>
> – A.H. Marks Jan. 24, 1929

But Monroe replies:

> I realize, as you say, that this console is an unnecessary luxury. However, as I am getting a great deal of satisfaction out of playing the semi-automatic rolls, of which I had no conception in the beginning, I believe .... [it] will be worthwhile....
>
> – J.R. Monroe Jan. 31, 1929.

The semi-automatic rolls play just the notes, but not the registration or expression, which, in the language of the advertising, "allows *you* to conduct the orchestra!" Suggested registrations and expression settings were helpfully rubber-stamped on the roll, but enthusiasts could create their own registrations, and vary them at will. Many of the titles in the Skinner library were released as both the "conduct it yourself" semi-automatic rolls, as well as fully automatic rolls controlling the notes, stops, and both expression boxes.

Tonally, these organs would typically contain the signature Skinner reed stops–*French Horn*, *English Horn*, *Clarinet*, and *Vox Humana* on the reed side, and a *Cornopean* on the flue side. Additionally, the player residence organs usually included a *Trumpet* stop, often an extension of the Pedal *Tuba*, of obliterating power. In many cases, including Op. 617, this stop was later disabled on the player relay, and only available when drawn on the console. The specification of Op. 617A oddly omitted the *Cornopean* normally found in the flue box, but included the overpowering *Trumpet*.

The *Trumpet* installed by Skinner in 1930 as part of the Op. 617A enlargements was originally made for a large four-manual church organ (Op. 745, 1928) but had been returned to the factory for exchange during the tonal finishing. It was of very limited musical value to the current owner, and clearly had been disabled at some point in its previous home, so we chose to transfer the *Trumpet* to storage and replace it with a Skinner *Cornopean* virtually identical to examples in other Skinner residence organs. This rank is now a unit stop available in the Pedal at 16-8 and the manuals at 8-4. (The particular *Cornopean* we used was recycled from Skinner Op. 628, most of which was otherwise incorporated into the new Bryn Athyn Cathedral instrument).

The Flue compliment includes a warm, gentle *Diapason*, and a triplet of two-rank celestes: *Flute Celeste*, *Voix Celeste*, and *Unda Maris*. An unusual feature of the Skinner residence player organs is that the celestes–Flute, Unda Maris, Voix, and Cello–generally share their toe board with the parent rank, and so can only be drawn as pairs. The *Cello Celeste* pair is found in the Reed expression box, along with a *Bourdon/Chimney Flute* unit at 16-8-4-2⅔-2. On the Flue side, an *Echo Lieblich/Concert Flute* unit is available at 16-8-4.

Percussion compliment includes the 61-note *Harp*, also available as the *4′ Celesta*, on the Flue side. The Reed chamber includes *Chimes*, a 49-note *Xylophone*, and *Bass Drum*. Several residence player organs include the xylophone. We can only speculate why, but xylophones were the hot new sound of the burgeoning Jazz Age.

The three-rank Echo organ, which in the organ's original home was located in an attic at the top of the main stairs, is located in the basement level below the main stairs in its new home. The size and shape of the music rooms and the relative location of the console and main chambers is nearly identical between the original and current installations. The organ components still remain in their original as-designed configuration.

The only tonal changes to Op. 617 since 1930 are the replacement of the *Trumpet* with the *Cornopean* and reconfiguring the *Xylophone* to be available as either re-iterating or single strike, bypassing the re-it contacts. A second *Harp* was added, along with a Wurlitzer toy counter and *Orchestral Bells* in the 2013 restoration.

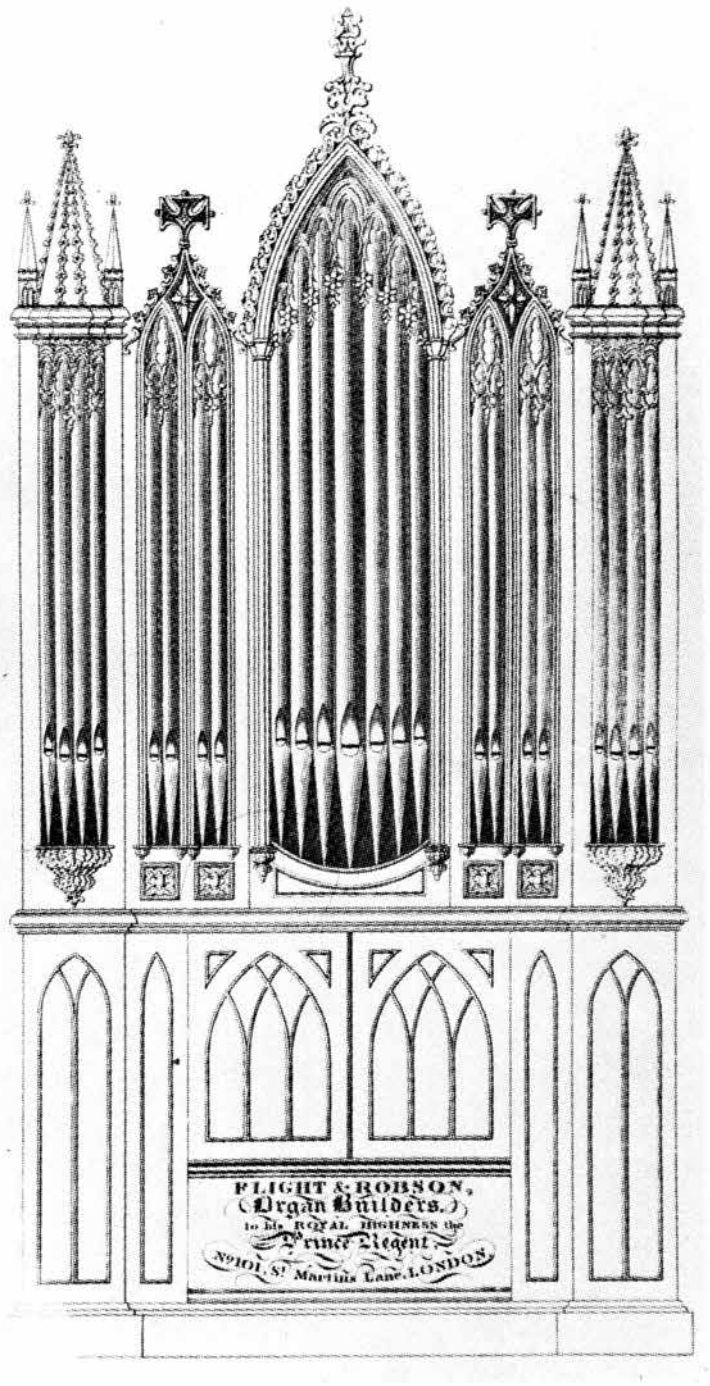
The original mechanical components were kept wherever practical. The in-chest relays have been replaced with modern solid-state relays. The original combination action, an unusual and fascinating "Converse Action" was initially retained and expanded with a contemporary surfeit of memory levels using Opus-Two equipment. However, decades of heavy use had left the combination machines too badly worn to be able operate reliably without a restoration so invasive as to obliterate any historic value. Since the machines were a modular design already, it was a simple matter to swap them out with modern equipment in such a way that the original machines can be preserved and easily reinstalled if that is ever desired.

The original player relay and spoolbox are fully functional, and were used to capture more than 300 Skinner rolls using the modern Barden Player system. An additional 600 titles are available on the system from other sources.

The original Kinetic blower was restored by Curt Mangel. A second Kinetic blower was added to simplify windline routing to the Echo. The winding system for the main organ remains unaltered.

FREDERICK HAAS RESIDENCE
Philadelphia, Pennsylvania

FLIGHT & ROBSON
Barrel organ ca. 1820
Renovated and relocated 2016 by Sean O'Donnell



Case image from a ca. 1817 Flight & Robson business card. The original is in the Guildhall Library, London.

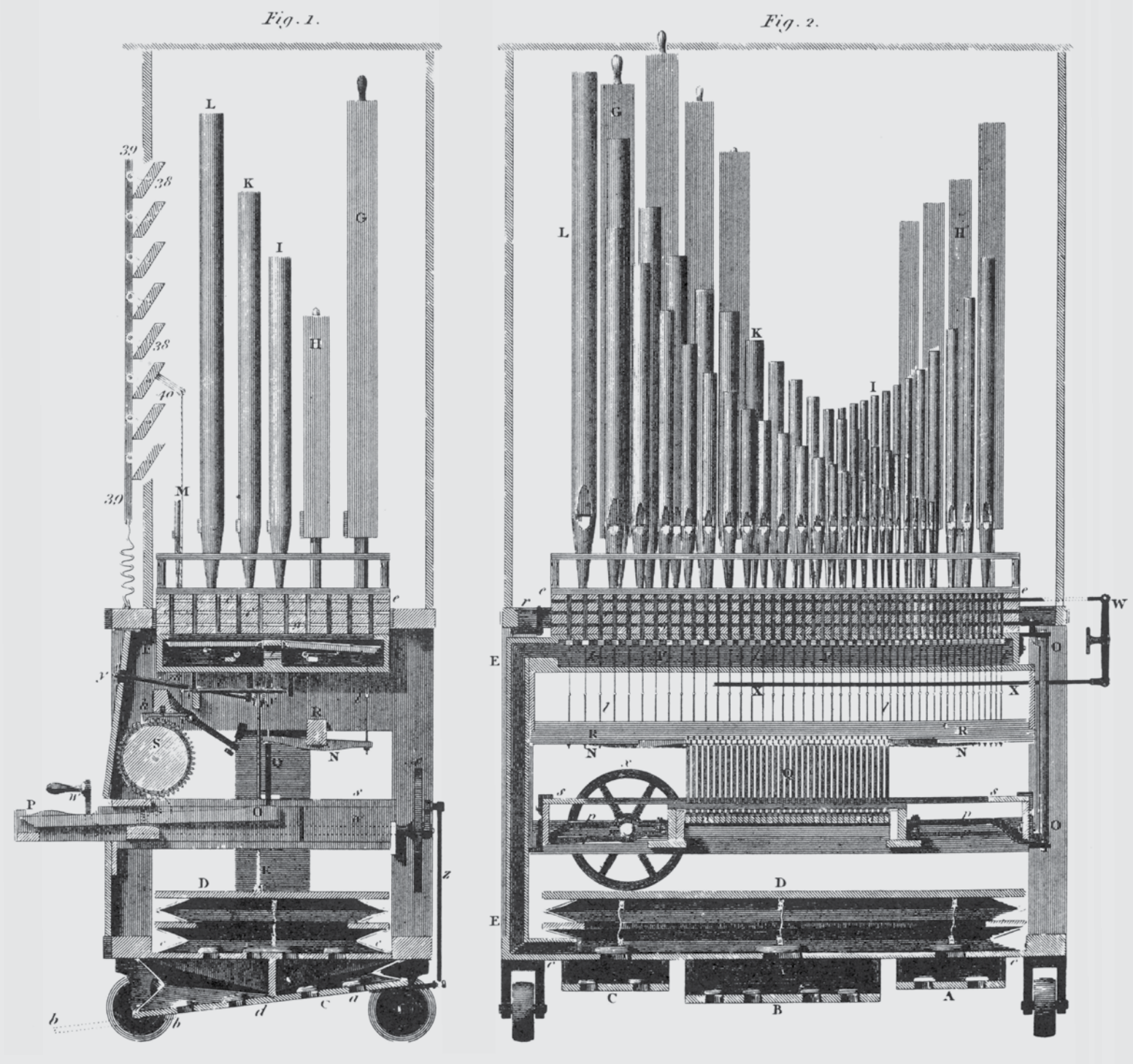
THIS RARE INSTRUMENT WAS ACQUIRED BY FAMED BALLET dancer Rudolf Nureyev and kept in his principal residence in Paris. His most valuable possessions were auctioned off by Christie's London in January 1995, upon his untimely death on 6 January 1993, at the age of 54. The auction netted over two-million dollars for the Rudolf Nureyev Foundation. The contents of his New York City apartment alone, realized over seven-million dollars in a separate sale.

Nureyev was germ-phobic, and kept his places of residence hot and dry as a consequence. Years of this environment wreaked havoc with the instrument's fragile antique mechanism through cracking and shrinkage, to the point the barrel pins no longer lined up with their respective note fingers. While the organ has not been restored, it has been carefully rehabilitated to functionality. While at some point in the organ's past the pipes had been shortened and placed into equal temperament, during their refurbishment they were put into a revolving well-tempered tuning having two pure triads on C and F Major, which is close to the Flight & Robson "meantone" system first published by Benjamin Flight in 1830 and in two subsequent editions, the last published in 1877.[1] This system tunes the C-G-D-A-E circle of 5ths tempered flat by ¼-comma to yield the pure third C-E, then tunes the C-F interval sharp until the F-A third is also pure. Continuing around the circle of fifths after the pure third C-E is established, the remaining fifths are tempered narrow to yield 5 additional pure or nearly pure thirds and sixths as additional check points. The F-B$^{\flat}$-E$^{\flat}$ is tempered so the wolf E$^{\flat}$-G$^{\#}$ "wolf" is tolerable. This tuning ultimately yields five ear-tugging "wolf" intervals. Flight made pains to instruct tuners that this was a church temperament, and for pianofortes and organs used in "concert salons", equal temperament was preferred, with "equally flat fifths". Tuning by tempered intervals with pure intervals and octaves as check points rather than as starting points, eliminates the tendency of organ pipes to draw into tune before the pipe being adjusted is actually top-dead-center in tune.

The gothic case is remarkably similar in many respects to the case drawing found on an 1817 advertisement card. Rather more elaborate than would be typical for a residence case, this church organ was a high-style rendition for its day, in both material and appearance.

1. Benjamin Flight, *Practical Tuner for the Organ or Pianoforte,* 3rd edition (London, Flight and Son, 1877)

FREDERICK HAAS RESIDENCE



Front and side elevations of a Flight & Robson barrel organ ca. 1814. Note the Cummings inverted fold on the double-rise reservoir and the double set of pallets, one for the keyboard and one for the barrel.

NAMEPLATE: Flight & Robson Organ Builders TO HIS ROYAL HIGHNESS THE Prince Regent No. 101 St. Martin's Lane, LONDON

LEFT SIDE	RIGHT SIDE
Open Diapason	Stop Diapason Treble
Stop Diapason Bass	Principal Treble
Principal Bass	Fifteenth Treble
Fifteenth Bass	Hautboy

Iron pumping pedal
General Venetian Swell pedal
Two Compound Machine pedals

Three pinned barrels (one extant) plus finger keyboard:
Compass: GG, AA, AA♯, BB-f³, 58 notes
Gothic-style case of mahogany, façade of gilded wooden dummies.

The presence of a finger keyboard on a barrel organ, if this is indeed original, would have been a further deluxe embellishment.

The English barrel organ had been around in one form or other since the 1780s, and even Dom Bedos includes a rendition of a small barrel organ in his famous treatise, for the teaching of songs to canaries. The high point of the genre's development occurred during the first half of the nineteenth century in England, with an especial popularity for small country churches and estate parishes deep in the country without a trained musician readily at hand. These instruments might have a wider keyboard range than the small residential organs, with the largest having a diapason chorus and perhaps even a reed. A well-known three-stop example of a church barrel organ is still in regular use in Pierrepont Manor, New York, built by George Jardine of New York City in 1842.

Residential instruments were typically smaller, between two and four stops and perhaps with a compass of only three octaves or less. Being pinned with secular tunes, often for dancing, the residential barrel organ would rarely have a finger keyboard, but might include drums, bells, and triangles as part of its tonal compliment. Good examples of American residential barrel organs can be found in Cooperstown, New York, the Jay mansion in Bedford, N.Y. and the Black house-museum in Ellsworth, Maine, the latter believed to be by the noted London builder of barrel organs, John Pistor, and includes a drum and triangle.

The Flight family was somewhat nomadic in its century-long association with organbuilding, moving about and reorganizing with various partners every few years:

Benjamin & William Flight, Exeter Exchange 1784-87
Flight & Kelley, Exeter Exchange, 1788-1800
Benjamin Flight Sr. Exeter Exchange, 1801-02
Benjamin Flight Sr. Leicester Square, 1803-05, Flight Sr. dies ca. 1805
Flight (Ben Junior) & Robson (Joseph), Leicester Square, 1806
Flight & Robson, 101 St. Martin's Lane, 1807-1832 (bankruptcy)
Flight & Son (John), 16 King William St., 1834-38
Flight & Co., 16 King William St., 1839-1848; Ben Jr. dies 1847
Flight & Co., 35 St. Martin's Lane, 1849-1887

While living in the extremely fashionable St. Martin's Lane, the Flight and Robson households were adjoining, with a communal workshop behind. During the 1832 bankruptcy auction, Robson not only bought all his tools back at a great discount and dissolved the Flight business debts, he also purchased the unexpired lease on the Flight home (forcing them to move). He continued his barrel-organ business for a number of years at this address before his heirs closed the business and sold their assets to the noted building firm, Gray & Davison in 1883. The Flight family moved to the Strand, another fashionable district, where Ben Jr. reorganized the business, working until his death in 1847 and continued by his heirs until closing in 1887.

The firm built one of the musical wonders of the day, *The Apollonicon* ca. 1830. It could be played by no less than three barrels simultaneously (2′ x 8′), or played manually by five organists at once. It consisted of four departments of various compasses, all under expression, including a three-octave Pedal division with a *Double Diapason* to 24ft. G, and *Trombone*. The Great organ was the largest division, five octaves, with a complete diapason chorus through mixture and trumpet. The Swell contained a small assortment of diapasons and flutes through fifteenth and trumpet, while manuals three through five were each of three octaves, containing an assortment of flutes, piccolos, and solo reeds, as well as an assortment of drums, bells, and triangles. Between the three barrels or five players, complex symphonic works and oratorios could be orchestrated from a full score. While it made no money for the makers as had been hoped, nor did it sell new instruments, the majority of organ concerts heard in London for the next twenty-years following the organ's construction were presented on this instrument, which was wildly famous in its day. However, the novelty eventually wore off, and with the organ barely being financially sustainable and with declining interest in its concert abilities, it was eventually broken up for parts which were recycled in various instruments for years to come.[2]

—Scot Huntington

2. Arthur Ord-Hume, *Barrel Organs, The Story of the Mechanical Organ and How to Restore It;* Allen & Unwin, London, 1978. 100-122.

ST. CLEMENT'S CHURCH

ST. CLEMENT'S CHURCH, EPISCOPAL

Philadelphia, Pennsylvania

ORGANBUILDER: M.P. Möller Co.
Hagerstown, Maryland
Opus 6136, 1933

ORIGINAL HOME: St. Paul's Church, Episcopal
Baltimore, Maryland

RELOCATED: St. Clement's Church, Episcopal
Philadelphia, Pennsylvania
Curt Mangel and Associates, 2017

Two Manuals, 16 Ranks, drawknob console

GREAT – Enclosed, 5″ wind pressure

8′	Open Diapason	61 pipes
8′	Clarabella	73 pipes
8′	Concert Flute	85 pipes
8′	Dulciana	73 pipes
4′	Octave	73 pipes
4′	Flute Harmonic	73 notes
2′	Fifteenth	61 pipes
III	Mixture	122 pipes
8′	Cornopean	73 pipes
	Chimes	
	Tremulant	

SWELL – Enclosed, 7″ wind pressure

16′	Bourdon	97 pipes
8′	Geigen Principal	73 pipes
8′	Stopped Diapason	73 notes
8′	Salicional	73 pipes
8′	Vox Celeste [t.c.]	49 pipes
4′	Orchestral Flute	73 notes
4′	Salicet	73 notes
2⅔′	Flute Twelfth	61 notes
2′	Piccolo	61 notes
8′	Oboe	73 pipes
8′	Vox Humana*	61 pipes
	Tremulant	

**Originally prepared for, the Vox was installed later.*

PEDAL

16′	Open Diapason	[Gt.]	12 pipes
16′	Bourdon		44 pipes
16′	Lieblich Gedeckt	[Sw.]	32 notes
8′	Flute Major		32 notes
8′	Dolce Flute	[Sw.]	32 notes

COUPLERS [on stop keys]

Great 16′
Great 4′
Swell to Great
Swell to Great 16′
Swell to Great 4′
Swell 16′
Swell 4′
Great Unison Separation
Swell Unison Separation
Great to Pedal [with toe reversible]
Swell to Pedal
Swell to Pedal 4′

#3F Mixture[1] "Separate rank for the 15th"

C-f^2	2⅔	2	1⅓
f$^{\sharp 2}$-f^3	4	2⅔	2
f$^{\sharp 3}$-c^4	5⅓	4	2⅔

Scales "Spotted metal"
12th Sc. 68 ⅓ mouth [48@8′, breaks to 4′ for top 7 notes]
15th Sc. 70 ¼ mouth [46@8′] borrowed rank
19th Sc. 80 ⅓ mouth [48@8′, breaks twice to 4′ and 5⅓′]

SOURCES: The original contract and engineering page from The Möller Archive: *American Organ Archives of the O.H.S.,* courtesy Bynum Petty, Archivist, with appreciation. Also Rick Morrison, Nathan Bryson, Nick Myers.

1. Courtesy Rick Morrison, email May 8, 2020, taken from his copy of the factory mixture book (ca.1920–ca. 1960). In this composition, the Mixture 2′ borrows the independent *Fifteenth*.

PHOTOS: Nick Meyers

C O P Y
#6136

executed in duplicate
MEMORANDUM OF AGREEMENT, made this Tenth day of January
A. D., 1933, by and between M. P. MOLLER, INC., of Hagerstown, Maryland,
party of the first part, and
Vestry of St. Paul's Parish in Baltimore County
party of the second part.

WITNESSETH: That the party of the first part hereby agrees to build an organ including casing, display pipes and console, after and according to the annexed specifications and to plans to be prepared by party of first part and approved by party of second part, and to be later attached hereto as part hereof and to install the organ complete and ready for use in the chamber space as now planned for the organ in ST. PAUL'S CHAPEL, Columbia Avenue and Calendar Street, Baltimore, Maryland, within nine (9) weeks after the approval of plans, providing the church is ready for its reception three (3) weeks previous to that date as hereinafter provided; otherwise as soon thereafter as the church is in proper condition to receive the organ. This date of delivery therefore to be subject to delays beyond the control of either party.

The party of the first part agrees that the organ when completed shall be first class, free from any defects in material or workmanship, and that any pipes of the former organ which may be used under this agreement shall be thoroughly repaired, revoiced, retone regulated and retuned, and in every way serve the required purpose the same as new pipes, and that the party of the second part may have it examined immediately on completion in the presence of representative of the first part by Mr. Edmund Serono Ender, or any other disinterested expert to be selected by party of the second part, and if said examination shows that the organ does not conform with this agreement and is not strictly first class mechanically and tonally, the party of the first part is to remedy any defects at his own cost and expense.

The party of the first part guarantees the action and construction of the organ throughout for a term of five (5) years from the date of completion, and agrees to correct immediately defects in material or workmanship that may be brought to its attention within that time without cost to party of the second part; also, the party of the first part will undertake the necessary tuning and care of the organ without charge for a term of one (1) year from date of completion. At the expiration of the said one year from date of completion, the party of the first part agrees to assume the care of the organ as long as desired by said party of the second part - four (4)

JAN 27 1933

tunings per year with any necessary intermediate adjustments for fifty ($50.00) dollars per year or two (2) tunings per year with any necessary intermediate adjustments for thirty ($30.00) dollars per year. This agreement for care of organ may be terminated by party of second part on thirty (30) days written notice.

For and in consideration of the above, the party of the second part agrees to pay to M. P. MOLLER, INC., or order the sum of THIRTY-FIVE HUNDRED - DOLLARS, and the existing parts of present organ. The party of second part agrees to furnish party of first part with an order on Louis A Hitchcock, Washington, D.C. for the delivery of the existing parts of the present organ, and to take such steps as necessary to procure them for party of first part.

Terms are based on cash on completion, or in the event of delay in party of second part receiving adjustment of fire insurance, this payment to be figured as cash on receipt of the insurance on the previous church, but if any part remains unpaid within thirty (30) days from the receipt of said insurance moneys, interest to be charged at the rate of six percent (6%) on such deferred payments, figuring also thirty (30) days after the completion of said organ as above.

It is mutually understood and agreed in these terms that the party of the first part assumes no responsibility for the collection or adjustment of said insurance.

The party of the second part agrees that the building will be in proper condition for the installation of the organ three weeks before the date of completion and that they will allow, free from interruption, suitable convenience and opportunity for the satisfactory installation of the organ and at least one week of absolute quiet for the final regulation and tuning, after the church has been fully completed and furniture placed; also, that they will furnish all necessary light, heat and power while installation is in progress.

The party of the second part also agrees to insure the organ or its parts against loss by fire, water, etc., as soon as the parts are placed in the building, for the benefit of the parties hereto, as their interests may appear.

The party of the second part agrees to provide satisfactory organ chambers with requisite partitions and openings for tone egress in accordance with the blueprints submitted herewith, variations in measurements excepted.

-3-

said organ chambers to be finished in smooth hard plaster or other approved finish for proper deflection of tone, so as to provide the best possible musical result for the carrying out of this specification; also, to provide suitable location and enclosure for the organ blower, the necessary electric wiring for the motor and starter and the electric conduits that are necessary under the fire code of the city of Baltimore and the galvanized iron wind conductor (round galvanized iron) between the blower and organ chambers, also lights in the organ chamber for erection and future care of the organ, but with the exception of the above, the party of the first part is to provide the organ, electric motor and blower installed complete, including all freight, drayage and other similar charges.

The purpose of this agreement between both parties is that the organ when completed shall represent the highest class of musical instrument of the size and specifications.

It is mutually agreed that the title and ownership of the organ shall remain with party of the firstpart until the contract price, before mentioned, has been fully paid, after which the instrument shall become the property of the party of the second part; also that all verbal agreements and understandings are merged in this contract, and the specifications and details of construction attached hereto.

IN WITNESS WHEREOF we have hereunto set our hands and seals this day and year first above written.

WITNESS as to M. P. Moller, Inc.

J. E. Fowler

as to Vestry &d

Howard May

M. P. MOLLER, INC.

E. O. Shulenberger, Sec'y (SEAL)
Party of the first part

Vestry of Saint Paul's Parish (SEAL)

in Baltimore County (SEAL)

by Arthur B. Kreegiving, Rector (SEAL)

(SEAL)
Party of the second part

To confirm with Foreign Corporation Laws, this contract is not binding until accepted by M. P. MOLLER, INC., at Hagerstown, Maryland.

M. P. MOLLER, INC.

By E.O.Shulenberger, Sec'y

Accepted, Hagerstown, Maryland

Jan. 10 1923.

M. P. MÖLLER Organ Factory

Pipe Organ No. # 6136 Date January 10, 1933

For St. Paul's Chapel, Baltimore, Md.

Action Electric Console Detached

Casing No. wood sample later Finish

Decorations Roman design approved by Arch. Motor Electric

Width of Key-bed Stop Controls Draw Knobs

No. Manuals 2 Wind Pressure 5 & 7

To be completed Blower pipe furnished by

SPECIFICATIONS

A-440 Reconditioned pipes may be used. Chamber, Blower pipe, Electrical wiring conduits, by purchaser. Display pipes, case, console pipes, chamber doors by Moller.

GREAT ORGAN

1	8'	Open Diapason	41 scale - 12 zinc-C.M.	61 Pipes
2	8'	Clarabella	Reg. - wood	73 "
3	8'	Dulciana	56 scale - 12 zinc-S.M.	73 "
4	8'	Concert Flute	Reg. - wood & metal	85 "
5	4'	Flute Harmonic	from # 4 - wood & metal	73 Notes
6	4'	Octave	56 scale - C.M.	73 Pipes
7	2'	Fifteenth	metal	61 "
8	III Rks.	Mixture	drawing # 7-#3F - metal	122 "
9	8'	Cornopean	4½" - reeds	61 "
10		Chimes (present bells)		

SWELL ORGAN

11	16'	Bourdon	L.Man.Bdn-Unit-wood	97 Pipes
12	8'	Geigen Principal	44 scale-12 zinc-S.M.	73 "
13	8'	Stopped Diapason	from # 11 - wood	73 Notes
14	8'	Salicional	60 scale - 12 zinc-S.M.	73 Pipes
15	8'	Vox Celeste	58 scale-S.M.-T.C.	61 "
16	4'	Salicet	from # 14 - metal	61 Notes
17	4'	Orchestral Flute	from # 11 wood & metal	73 "
18	2'	Piccolo	from # 11 wood & metal	61 "
19	8'	Oboe	3½" open - reeds	61 Pipes
	8'	Vox Humana	prepared for on console only	

PEDAL ORGAN

20	16'	Open Diapason	12 pipes - 32 scale - metal	32 Notes
21	16'	Bourdon	L. Bdn - wood	44 Pipes
22	16'	Lieblich Gedeckt	from # 11 - wood	32 Notes
23	8'	Flute Major	from # 21 - wood	32 "
24	8'	Dolce Flute	from # 11 - wood	32 "

COUPLERS

25	Great to Pedal	29	Swell to Great 16'	33	Great 16'
26	Swell to Pedal	30	Swell 4'	34	Great Unison Sep.
27	Swell to Great	31	Swell 16'	35	Swell Unison Sep.
28	Swell to Great 4'	32	Great 4'		

MECHANICALS

36	Great Tremulant	37 - Swell Tremulant	Crescendo Indicator

ADJUSTABLE COMBINATIONS

(Operated by pistons placed under respective manuals)

Pistons No. 1-2-3-4	Affecting Great Stops
Pistons No. 1-2-3-4	Affecting Swell Steps
Pistons No. 1-2-3-4	Affecting Pedal Stops
Pistons No. 1-2-3-4-0	Affecting Full Organ

PEDAL MOVEMENTS

1	Great to Pedal Reversible	Organ bench with music shelf
2	Balanced Great Pedal	Concave Pedal
3	Balanced Swell Pedal	Electric motor, blower and action current generator of ample capacity
4	Grand Crescendo Pedal	

Jan.18/1933

ST. CLEMENT'S CHURCH

ESSAY I BY DR. DONALD R.M. PATERSON

Richard O. Whitelegg, A Biography

SOURCES: Obituary in *The Diapason,* Jan. 1945 and in-person interview with Mr. Einar Olsen.

Reprinted by permission from *The Tracker,* XVI:1:9, Fall 1971.

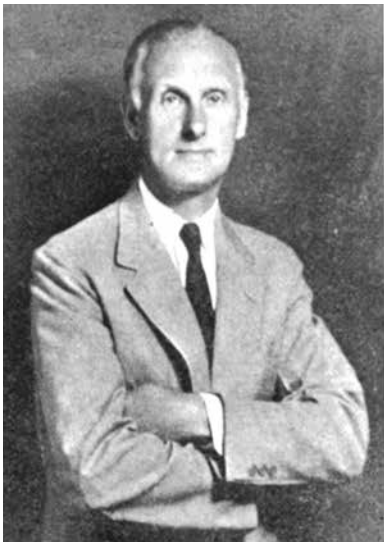
RICHARD OLIVER WHITELEGG WAS BORN ON AUGUST 24, 1890, in the country of Cheshire, England. He studied organ playing at an early age, and was an apprentice in organ construction for seven years, apparently in his "teens". At the age of 14 he "passed the intermediate examination for Trinity College of Music, London, and was under the tutelage of Herbert Wild, A.R.C.O., organist of St. George's Church, Stockport."

Whitelegg spent a short time after his apprenticeship with the famous organbuilders Harrison & Harrison, of Durham. Later he was associated with the firm of August Gern, in London, and with Evans & Barr, Belfast, Ireland. During World War I he was an aeronautical engineer, and was with Henry Willis (III) for several years after the War.

Early in 1926 Whitelegg came to America for the first time, as a London representative of the Aeolian Company, and went to Garwood, New Jersey, as a reed voicer. Later on that year he returned to England, but came back to the U.S. early in 1927 on a regular immigration visa, to become the Head Voicer for the Welte-Mignon Organ Company in the Bronx (New York City). At that time, Mr. Einar Olsen, now Head Voicer for M.P. Möller [1971], began his apprenticeship under Whitelegg. Mr. Olsen (an expert voicer) states that "the little I know about voicing I learned from him."

In the latter part of the 1930s, Whitelegg became associated with Möller, in Hagerstown, and later became a director of the company. Mr. Olsen states that "it was here where he showed his tremendous skill as a voicer, tonal designer and organbuilder," and says, "in my humble opinion he was one of the foremost voicers in his day, if not the only one with the rare blessing of being able to "voice reeds and flues alike and also play." Mr. Olsen further states (although admitting that he is "biased"), that he finds it "hard to name any man in our fraternity today that can equal this", and that "his diapason and reed choruses were outstanding and a revelation to the organbuilders in this country." (We recall with special vividness an organ in Columbus, Ohio, built by Möller in the late 1930's which was voiced by Whitelegg. Its singing tone in a rather unsympathetic acoustical environment was musically demonstrated by Vernon de Tar in an A.G.O. master class in the early 1960's. We agree that his diapason and reed choruses were outstanding.

Several organs remain today which are monuments to Whitelegg's art[1]. They include installations at Crescent Avenue Presbyterian Church, Plainfield, N.J.; Holy Name Roman Catholic Church, New York City; Pomona College, California; and many others. (The example at First Reformed Church, New Brunswick, N.J. was recently [1971] burned by vandals.) Of the later examples which show his willingness to deal with the new trends towards the "classic" and "neo-classic" thinking of the late thirties and early forties, the 1940 Möller in the Chapel of Gettysburg Lutheran Seminary[2] remains, among others.



Richard O. Whitelegg (1890–1944). Photo as reprinted from *The Diapason;* reproduced by C. Hadley Smith, Ithaca, N.Y.

This account of one of American's most significant "organ men" concludes with a quotation from Mr. Olsen's letter of 9 November 1971 to the author:

> Dick was a rather serious man and I find it difficult to recall any stories either colorful or humorous, except this one: I was only a youngster about 17 when Dick came back from England in 1927 to the old Welte shop. He wore the usual English trousers, way above his hips with suspenders, or braces, as he called them. One of the boys snapped them and this made him very mad. He did not say a word; he simply turned around very red-faced, picked the boy up by the seat of his pants and heaved him out of my voicing room. Needless to say, no one every snapped his braces again. The next morning Dick came to work with a belt around his trousers.
>
> Another incident that stands out in my mind and that I will never forget is this. When we were youngsters and were awed and inspired by his knowledge and ability as a voicer, we asked him this question: What must you know to be a top voicer? His answer was: To know what you want, to know how to get it, to know when you have it, and to know how to do it yourself. How many of these so-called Tonal Directors would know how to do this today, if it were not the unsung boys in the voicing rooms?

1. 2022: The New York City organ is largely unplayable but some restorative work in underway as funding permits, the Pomona College organ was rebuilt in 1976, and the Plainfield instrument was greatly enlarged in 1961, then substantially rebuilt in 2002-06.

2. Replaced by a new organ in 1980, the organ was eventually moved to SS. Peter and Paul, Easton, Maryland, enlarged, but with the original pipework said to be essentially left unaltered.

ESSAY II BY **NATHAN BRYSON**

SAINT CLEMENT'S CHURCH IS A GEM ARCHITECTURALLY, musically, and liturgically. It is an Anglo-Catholic parish located in Logan Square, Center City, Philadelphia and is part of the Episcopal Diosese of Philadelphia. On September 13, 1855, a charter was granted to "The Rector, Churchwardens, and Vestrymen of Saint Clement's Church in the City of Philadelphia." The first Rector was the Rev'd Henry S. Spackman, who was elected as soon as the first charter was received, and his rectorate began officially on January 1st, 1856.

The building was designed by architect John Notman and was the third Episcopal Church in the city to be designed by him. He also designed St. Mark's Church on Locust Street and Church of the Holy Trinity on Rittenhouse Square. All three were constructed entirely of brownstone, between 1847 and 1859. The cornerstone of the church was laid on May 12, 1856, by the Rt. Rev. Alonzo Petter, the third bishop of the Diocese of Philadelphia. St. Clement's was built in Romanesque Revival style, as was Church of the Holy Trinity, while St. Mark's was built in the Gothic Revival style. The construction of St. Clement's ultimately took three years due to recurring financial problems, but it finally opened for services in January of 1859 and was consecrated on April 12, 1864.

Notman drew a distinction between the type of architecture appropriate to High and Low Church Episcopalian theology. At the time, St. Mark's was High Church and was designed in the Gothic Revival Style, while St. Clement's, being then Low Church, was designed in the Romanesque Revival style. Herman Griswold Batterson (1827–1903) was named rector in 1869 and being influenced by the Oxford Movement, immediately began moving the congregation toward the liturgical practices associated with the Catholic Revival then sweeping through the Church of England. The congregation divided into factions and the Low Church faction succeeding in removing Batterson. However, the High Church faction took control of the Vestry in the next election, and as the church came under the control of the Crowley Fathers (1876-1891), the church's movement toward Anglo-Catholicism continued and the Low Church faction withdrew.

The interior of the church is dominated by the large carved oak reredos and triptych, installed in 1908, which stand above the high altar. The central panel of the triptych depicts Christ on the cross, clothed in the vestments of the Holy Sacrifice of the Mass, with the Blessed Virgin Mary and St. John the Apostle at the foot of the cross. South of the sanctuary is the Lady Chapel, which features an altar and reredos of English red stone. The central niche of the reredos contains a statue of the Virgin and Child while the two side niches contain statues of St. Joseph, and St. Elizabeth with St. John the Baptist. Located in the nave, the Shrine of Our Lady of Clemency climbs to a height of some twenty-five feet and features a statue of the Blessed Virgin depicted as the Queen of Heaven replete with crown and scepter. The nave also contains shrines dedicated to the church's major patron, Pope Clement I, pope from 88–97 AD, and to the church's minor patron, St. Catherine of Alexandria.

The building underwent several significant structural changes during its first century. The belltower was originally topped with a spire of over 200 feet, but the weight of the spire proved more than the foundation could support and was removed in 1869 to prevent further damage. In the early 20th century, the roof of the apse was raised approximately 15 feet with the installation of a clerestory in order to accommodate the installation of a triptych that currently stands above the high altar.

The Rev. Charles S. Hutchinson was elected Rector in June 1905. During his rectorate the present Parish House was built, the new organ installed the east end of the Church, the east end of the Church was entirely renovated and beautified, and the Lady Chapel (Boudinot Chantry) was erected. Later still in 1929, the church building, including the rectory and parish house had to be moved to allow for the widening of 20th Street. The entire structure, weighing more than 5,000 tons, was lifted onto steel rollers, and moved forty feet west.

Father Hutchinson left the parish in 1920 to become Dean of the Cathedral in Milwaukee, and subsequently Rector of St. John's, Newport, Rhode Island. The Rev. Father Franklin Joiner, his curate, succeeded him as Rector. During Fr. Joiner's rectorate, beautification of the church continued. The present pulpit and its baldacchino was added. Later, new Stations of the Cross were erected, the stained-glass windows installed, the High Altar, pulpit, and Stations were polychromed, and the Shrine of Our Lady of Clemency was dedicated (1943). Fr. Joiner presented the church with the Statue of St. Clement as a thank-offering for his silver jubilee of ordination (1944), and prior to his retirement, St. John's Chapel was remodeled.

St. Clement's uses the 1928 Book of Common Prayer, and an English-language translation of the Latin Tridentine Mass as it existed prior to the pre-1955 reforms of Pope Pius XII. A sung High Mass is celebrated every Sunday and on Feast days.

Organ music has been an integral element of worship at St. Clement's since its inception. The two current organs fill an essential role in the musical and liturgical life of the parish. The 1914 Austin organ in the nave incorporated material from the two previous organs, J.C.B. Standbridge (1854) and Hilborne Roosevelt (1883). In 1948, a new Austin console was installed, and some tonal changes were made with additional tonal 'modernizations' occurring in the 1960's. With the exception of a number of new digital and pipe voices, the instrument is being returned closer to its original 1914 specification, using vintage Austin pipework wherever possible. Several orchestral voices, including a Skinner *French Horn* have been added to the specification.

ST. CLEMENT'S CHURCH

A comprehensive reconstruction project, completed in 1997, involved several fine craftsmen: Samuel H. Hughes (reed stop restoration), Steven Emery (mechanical restoration and tuning), Robert Wuesthoff/Fritzsche Organ Co. (chamber and pipe cleaning), Bynum Petty (Choir Organ pipework revoicing) and Bob Schopp (façade refinishing and *Trumpet en Chamade*). The capstone of the project was the installation of a new console built by R.A. Colby of Johnson City, Tennessee. Replacement of the Austin windchests with new slider chests to alleviate severely cramped service access is under discussion as the next phase of the project.

ST. CLEMENT'S CHURCH, EPISCOPAL

Philadelphia, Pennsylvania

AUSTIN ORGAN CO., NO. 507, 1914

Altered Austin 1948, 1969, 1997.
Present renovations on-going, Steve Emory and others.

PRESENT 2022 STOPLIST

SOURCE: Church website; Nathan Bryson
[ ] Digital voices in brackets
Stops from the Roosevelt/Standbridge in italics

GREAT (61 notes)

16′	*Double Diapason*	
8′	*First Diapason*	
8′	Second Diapason	
8′	Waldflute	
8′	*Violincello**	
8′	Cello Celeste*	from C
4′	Octave	
2′	Fifteenth	new, OSI
8′	Orchestral Oboe*	prepared
8′	French Horn*	Skinner Organ Co.
8′	Harmonic Trumpet*	
8′	Trumpet en Chamade	new, A.R. Schopp
	* *enclosed in Choir Box*	
4′	Great	

SWELL (enclosed, 73 notes)

16′	*Bourdon*	
8′	*Open Diapason*	
8′	Stopped Diapason	extension 16′
8′	*Melodia*	
8′	Bois Celeste	prepared, tenor-c
8′	Viola	
8′	Viola Celeste	from C
8′	Orchestral Celeste	2 rks.
4′	*Octave*	
4′	*Harmonic Flute*	
2′	Flautino	61 pipes
[V	Cornet]	digital
III	Mixture	new, A.R. Schopps, Skinner A-5
	C 2′ 1⅓′ 1′	
	f⁰ 2⅔′ 2′ 1⅓′	
	f¹ 4′ 2⅔′ 2′	
	Unisons Sc. 44 @ 8′	
	Quints Sc. 48 @ 8′	
16′	Double Oboe	
8′	Cornopean	
8′	Oboe	extension 16′
8′	Vox Humana	
4′	Oboe Clarion	extension 16′
	[Metalophone]	digital, 49 notes
	Tremolo	
8′	Trumpet en Chamade	Gr.
16′	Swell	
4′	Swell	
	Swell Unison Off	

CHOIR (enclosed, 73 notes)

[16′	Double Dulciana]	
8′	Geigen Diapason	
8′	Claribel Flute	
8′	Violin	
8′	Violin Celeste	2 rks.
8′	Dulciana	
8′	Unda Maris	tenor-c
4′	Forest Flute	
4′	Gambette	
8′	Clarinet	
[8′	Capped Oboe]	digital
[8′	Vox Humana]	digital
	[Harp]	digital
	Tremolo	
8′	Trumpet en Chamade	Gr.
16′	Choir	
4′	Choir	
	Choir Unison Off	

SOLO (enclosed, 73 notes)

8′	Grand Diapason	
8′	Major Flute	
8′	Grand Gamba	
8′	Gamba Celeste	from C
8′	Tuba	
8′	English Horn	Kimball
	Tremolo	
8′	Trumpet en Chamade	Gr.
16′	Solo	
4′	Solo	
	Solo Unison Off	

PEDAL (32 notes)

[32′	Contra Violone]	digital
[32′	Contra Bourdon 32]	digital
16′	First Diapason	
16′	Second Diapason	
16′	Metal Diapason	Gt.
16′	*First Violone*	
[16′	Second Violone]	digital
[16′	Bourdon	
16′	*Soft Bourdon*)	Sw.
[16′	Dulciana]	digital, Ch.
8′	Octave	extension 1st Diap.
[8′	Geigen Diapason]	digital
[8′	Flute]	digital
[8′	Soft Flute]	digital
8′	Viola	Sw.
4′	Octave Flute	Gt.
[32′	Ophecleide]	digital
16′	Trombone	Solo
16′	Double Oboe	Sw.
8′	Tuba	Solo
8′	Oboe	Sw.
8′	Trumpet en Chamade	Gt.
8′	Pedal (Octaves)	
	Pedal Divide	Selectable

ECHO ORGAN (73 notes, 16 ranks - from Chapel organ)

* Double enclosure

16′	Bourdon*	
8′	Diapason	
8′	Geigen*	
8′	Clarabella	
8′	Concert Flute	
8′	Stopped Diapason*	extension 16′
8′	Salicional*	
8′	Voix Celeste*	tenor-c
8′	Dulciana	
[8′	Vox Angelica]	digital, 2 sound units per note
4′	Octave	
4′	Traverse Flute	extension
4′	Lieblich Flute*	extension 16′
4′	Salicet 4*	extension
2⅔′	Quint Flute*	extension 16′
2′	Fifteenth	from Mixture
III	Mixture	
8′	Cornopean	
8′	Oboe*	
8′	Vox Humana*	
	Tremolo	
	Chimes	
16′	Echo	Sub and super couple through
4′	Echo	
	Echo Unison Off	

ECHO PEDAL (32 notes)

16′	Diapason	extension Diapason
[16′	Violone]	digital
16′	First Bourdon*	
16′	Second Bourdon*	
8′	Flute Major 8*	extension 1st
8′	Dolce Flute 8*	extension 2nd

* = Double enclosure

COUPLERS

Swell to Great	16′, 8′, 4′	Swell to Pedal	8′, 4′
Choir to Great	16′, 8′, 4′	Choir to Pedal	8′, 4′
Solo to Great	16′, 8′, 4′	Solo to Pedal	8′, 4′
Great to Choir	8′	Echo to Pedal	8′, 4′
Swell to Choir	16′, 8′, 4′	Echo on Great	
Solo to Choir	16′, 8′, 4′	Echo on Swell	
Great to Solo	8′, 4′	Echo on Choir	
Swell to Solo	8′, 4′	Echo off Solo	
Great to Pedal	8′		

MAIN CONSOLE ACCESSORIES

Great/Choir transfer
160-level combination action
1-20 General Pistons (1-10 Duplicated in Toe Studs)
1-7 Divisionals to all Divisions
1,2 Divisional Toe Studs to Swell, Great and Solo
1-3 Pedal Divisional Toe Studs
General Cancel
Manual to Pedal Divisional Pistons Coupler, for each Division
Piston Sequencer, with full complement of NEXT and PREVIOUS pistons
Expression 'thumb slides' under each manual
Two adjustable Crescendo sequences
Settable Tutti (for each memory level)
Roland Sequencer (for Record/Playback)
Transposer

ST. CLEMENT'S CHURCH

St. Clement's Church, Episcopal
Philadelphia, Pennsylvania
Austin Organ Company
Contract No. 507, signed June 4, 1914
Organ finished December 1914.
Original contract source: The Austin Organ Co., with appreciation.

The following is a transcript of the typed stoplist. All hand-written annotations and changes are in *italics*, and original punctuation or lack of it, follows the original. Editorial notes in [] brackets.

"Pitch of old organs is ½ way between Concert and International. Most pipes moved up." [A450 and A435, respectively]

GREAT ORGAN. [*enclosed in Choir box]

Double Diapason.	16′	61 pipes	*12 old fronts, 30 scale; Ten c# & d# new to replace fronts; tenor-e 43 scale*
Principal Diapason.	8′	61 pipes	*Old moved up? 14 fronts 39 scale*
Open Diapason.	8′	61 pipes	
~~Gemshorn~~ *Violoncello	8′	61 pipes	*(mild) Use old Violin 48 sc. (T.C. Bell Gamba Type.)*
~~Doppel Flute~~ Gross Gedackt	8′	61 pipes	*Pedal extended, all on pedal chest*
*Hohl Flute.	8′	61 pipes	*Old, 6⅝ x 7⅜, open bass*
*Wald Flute.	4′	61 pipes	*Old, stopped bass.*
Octave.	4′	61 pipes	*Old, 58 scale, voice as at present, not too strong*
Super Octave.	2′	61 pipes	*Old.*
*Mixture.	*3 Rks.*		*Old Choir Mixture*
*Trumpet.	8′	61 pipes	*New.*
Swell to Great.			
Swell to Great Sub.			
Swell to Great Octave.			
Choir to Great			
Choir to Great Sub.			
Choir to Great Octave.			
Solo to Great Unison.			
Solo to Great Super.			
Solo to Great Sub.			

Eight adjustable composition pistons to control Great and Pedal stops and couplers.

SWELL ORGAN. [enclosed]

Bourdon.	16′	73 pipes	*Old, 7⅜ x 8⅜*
Open Diapason.	8′	73 pipes	*Old, T.C. 56, Bass new 46*
Viole d'Orchestre.	8′	73 pipes	*New, Viole d'Amour substitute in 1948*
Viole Celeste.	8′ *134*	~~73~~ pipes	*New [sharp, 73 pipes], plus addition of flat rank of 61 pipes*
Quintadena	*8′*	*73 pipes*	*New*
Melodia.	8′	73 pipes	*Old (bass as at present), new at T.C.*
Stopped Diapason.	8′	73 pipes	*Old, new bass; Spitzflute 8′ substituted in 1948*
Dolce.	8′	73 pipes	*Old, 49 scale or new to save space*
Octave.	4′	73 pipes	*Old, 60*
Harmonic Flute.	4′	73 pipes	*Old, 2 octaves wood, rest metal*
Flageolet.	2′	61 pipes	*Old, increased to proper scale*
Mixture. 3 Ranks		183 pipes	*Old*
Double Oboe Horn.	16′	*85* pipes	*Old, new bass [3-stop unit]*
Oboe.	8′		*Use old 8′ Oboe, T.C. only.*
Oboe Clarion.	4′		*This stop inserted in ink*
Cornopean.	8′	73 pipes	*New, 4 ½, smooth and round*

Vox Humana.	8′	73 pipes	*New, reg.*
Tremolo.			
Swell Sub.			
Swell Unison Off.			
Swell Octave.			
Solo to Swell Unison.			

Eight adjustable pistons to control Swell and Pedal stops and couplers.

CHOIR ORGAN. [enclosed]

Open Diapason.	8′	73 pipes	*Old, 43 scale*
~~Dulciana.~~			
Salicional.	8′	73 pipes	*New*
Vox Angelica.	8′	61 pipes	*New*
Stopped Diapason.	8′	73 pipes	*Old, present voicing good. Nazard 2⅔′ substituted in 1948*
Concert Flute.	8′	73 pipes	*New*
Unda Maris.	8′	61 pipes	
Rohr Flute.	4′	73 pipes	*Old, metal, stopped*
Piccolo.	2′	61 pipes	*Old, moved up to make proper scale. Flute like.*
Clarinet.	8′	73 pipes	*New*
Tremolo.			
Choir Sub.			
Choir Unison Off.			
Choir Octave.			
Swell to Choir Sub.			
Swell to Choir Unison.			
Swell to Choir Octave.			
Solo to Choir Unison.			
Solo to Choir Sub.			
Solo to Choir Super.			

Eight adjustable combination pistons to control Choir and Pedal stops and couplers.

SOLO. [enclosed] *7″ wind.*

Grand Diapason.	8′	73 pipes	*Large scale, 37-40 Bass*
Flauto Major.	8′	73 pipes	*Reg. with stopped bass*
Gross Gamba.	8′	73 pipes	*sc. 55*
Gamba Celeste.	8′	73 pipes	*sc. 55*
Tuba Harmonic.	8′	73 pipes	*32 internal borrows*
Orchestral Oboe.	8′	73 pipes	*New, reg.*
Tremolo.			
Solo Sub.			
Solo Unison Off.			
Solo Super.			
Great to Solo Unison.			

Eight adjustable composition pistons to control Solo and Pedal stops and couplers.
#6,7 & 8 for Pedal only, strips of ivory placed between #5 and #6.

PEDAL ORGAN.

Resultant Bass.	32′	32 notes	
Magnaton.	16′	32 pipes	*Reg. Open bearded, voiced big 7″ wind*
Open Diapason.	16′	*44* pipes	*Old, moved up 2*
Violone.	16′	32 pipes	*New CCC wood, then 15 fronts #28 scale, EE 33 scale*
Bourdon.	16′	*56* pipes	*Old Quint, 3 or 4 new basses, Tibia Clausa scale*

ST. CLEMENT'S CHURCH

Lieblich Gedeckt.	16′	32 notes	(From Swell)
Octave. (from Open)	8′	32 notes	(From Open)
Oct. Flute	4′	32 notes	(From ~~Op.~~ Bdn) [*Super Octave erased*]
Flute.	8′	32 notes	(From Bdn.)
Trombone.	16′	12 pipes	(Tuba Ext.) *Encl. in Solo*
Tromba.	8′	32 notes	(From Solo)
Double Horn	16′	32 notes	(From Swell.)
Great to Pedal.			
Swell to Pedal.			
Swell to Pedal Octave.			
Choir to Pedal.			
Solo to Pedal.			
Solo to Pedal Octave.			
Pedal to Pedal Octave.			*To be done by Solenoid action in organ*

Six Adjustable composition pedals to control Pedal stops and couplers.

ACCESSORY.

Balanced Crescendo Pedal, adjustable, not moving registers.
Balanced Swell Pedal.
Balanced Choir and Great Pedal.
Balanced Solo Pedal.
Great to Pedal, Reversible.
Solo to Great, Reversible.
Solo to Pedal, Reversible
Sforzando Pedal.

Eight special adjustable pistons over upper manual, controlling the entire organ, including couplers.
Swell Pedal indicators over top manual. *same as Chapel of the Intercession.*
Swell Pedals to lock together optionally and work as a master Pedal.
Part of the eight pistons under Solo manual, to operate Pedal organ *only*, said pistons to be designated by Mr. Fry. *#6,7, & 8*
Five combination pedals, duplication manual pistons, to be decided upon by Mr. Fry (whichever Mr. Fry prefers duplicated). *see console diagram*
"Console layout full size to be submitted to Mr. Fry."
"Sliding Music rack sliding from centre to left."

ESSAY BY SCOT HUNTINGTON

THE FIRST ORGAN IN THE CHURCH WAS AN 1841 HENRY ERBEN. This was replaced by a large four-manual John Standbridge organ originally built in 1854 for the Harmonia Sacred Music Society. When they went bankrupt in 1858 the organ was placed in storage for a short time before eventually being installed at St. Clement's where Standbridge (†1871) was the organist. Standbridge organs were noted for their innovation and excellence of tone, but they weren't especially well built, and a number were rebuilt or replaced within a few decades of their construction. In 1883, Hilborne Roosevelt of New York City and Philadelphia rebuilt and downsized the organ as his No. 125, a 3-44. Roosevelt recycled perhaps as many as half of the old Standbridge ranks.

This was in turn replaced by the Austin Organ Company's No. 501 in 1914, a 4-55, which also reused 24 ranks from the former organ in whole or in part. John T. Austin had filed eight patents for improved console mechanisms between 1911 and 1915, and in a 1914 ad Austin proclaimed the introduction of "The New Austin Console". The many improvements Austin had been developing over time were now in place: all-electric design, stop keys of signature shape, "hold and set" adjustable combination action (typically eight pistons per keyboard which could function either as divisionals or generals as selected by the organist), canceler bars over the stop keys. "*de Luxe*" key touch that we now refer to as toggle "tracker touch", a console casework easily disassembled to access the console workings which were self-contained in a steel frame, interchangeable parts, keyboards that swing up for access to the contacts, signature toe stud shape, and coupler trays permitting a full complement of sub and super couplers.

The console for St. Clement's was one of the first to incorporate all these new improvements in one unit. The basic design of the modern Austin console has changed little over the years since it reached this early peak of perfection. The organ was dedicated on December 16,

1914, by Englishman Henry Fry (1875-1946) who was organist from 1911 to 1943, and who stipulated several innovations specifically for this console: a music rack that slid side to side and expression pedals that could be locked together to function as a Master Pedal.[1] He was also largely responsible for the tonal design and no doubt was the driving force encouraging the preservation of such a large amount of legacy pipework.

The original contract stipulated Austin could use any "good" ranks from the original organ which could be "adapted", and they were to be fitted with new tuning slides. The swell boxes were to be 3½ inches thick and "of double construction". The organ was reviewed in *The Diapason* in 1919 and the reviewer was effusive in his praise of the instrument's mellow tone, remarkably smooth crescendo build-up to full organ, string tone that did not usurp that of the diapasons, and in general praised the musical elegance of the design as conceived by Dr. Fry. Singled out for special praise were the reused antique Stopped Diapasons and the overall impression of the organ being "rebuilt" and not a new instrument, as the voicing was "bright rather than thin" and "...avoided the tubbiness so common" in contemporary instruments of the day. A final comment is of special attention for our purposes:

> The organ at St. Clement's Church is a monument to the technical knowledge, common sense and fairness of its organist. These qualities are not always found together, but when they are, the right kind of organbuilder will gladly assume the task of co-operating in producing an organ that is a joy to play and to listen to. The builder will respect such an organist's opinion–he will bring forth his own best for the feast, and he will not be ungenerous in assigning to the organist, the credit he deserves for the vision he saw as well as the reasonableness of his attitude. And such an organist will honor the man without whom his vision would never have materialized, and he will secure for him proper compensation.[2]

The Austin files have preserved correspondence from organist Fry and one letter in particular makes several important changes to the specification while the organ was under construction.[3]

> Omit Choir Dulciana 8′ and substitute a Quintadena 8′ to the Swell; Omit Gemshorn 8′ from Great organ & substitute a Violoncello (rather mild) for it; Omit Doppel Flute 8′ from Great Organ and substitute the following (a & b) for some:
>
> a – Pedal Bourdon to be borrowed on the Great manual at 8′ pitch.
>
> b – An additional rank of 61 pipes to be added to the Swell Viole Celeste[4]

Handwritten notes on the contract include an indication that the Great Violoncello 8′ ("Use old Violin") was of the "Bell Gamba Type", and instructions for the old Great Octave 4′ – "voice as present, but not too strong". The Swell Harmonic Flute 4′ has "two octaves of wood with the rest of metal"; the new Cornopean 8′ was to be "smooth & round."

Sadly, the praiseworthy antique Choir *Stopped Diapason 8′* was lost to a *Nazard 2⅔′* in a 1948 tonal modernization, the historic Swell stop of the same name was similarly replaced with a *Spitzflute 8′*. The colorful 1914 *Viole d'Orchestre 8′* was discarded in favor of a more broad *Viole d'Amour 8′,* and the original console was also replaced at this time. Additional tonal changes in keeping with the tastes of the day continued between the 1960s and 1990's. During the current tenure of Choirmaster and Organist Peter R. Conte, many of the previous neo-baroque tonal changes are being reversed to guide the organ back toward its 1914 roots, but precious few of the original 24 ranks of legacy 19th-century pipework have survived. The recently relocated Whitelegg Möller in the chapel can be now heard as a tonally complimentary Echo division through a newly constructed rose-window opening from the chapel chamber into the main church, and with duplicate controls on the new rocking-tablet Colby console (laid out in horizontal terraces in the style of the Wanamaker organ), including a secondary set of shutters between the chapel pipework and main church which offer dual levels of expression control over the Echo.

PHOTO: Rau Art Studios, Inc., 1921

1. *Austin Organs,* Orpha Ochse; Organ Historical Society, Richmond, 2001. 137
2. *The Diapason,* November 1, 1919
3. Letter from the Austin Organ Co. to Henry Fry at the Hotel Astor, New York City, May 15, 1914, confirming receipt of his letter regarding changes to the specification.
4. The two-rank Sw. Celeste therefore contained two non-unison ranks, one of 73 pipes tuned sharp of unison, and the other of 61 pipes tuned flat.

ST. MARK'S CHURCH

ST. MARK'S CHURCH, EPISCOPAL
Philadelphia, Pennsylvania

AEOLIAN-SKINNER ORGAN CO.
Boston, Massachusetts
Organ No. 948, 1937

New Console: Austin Organ Co. 1965
Renovation, new *Grand Choeur I & II* rear gallery, console:
Cornel Zimmer, 2002
Restoration and Antiphonal division replacing *Grand Choeur*:
Steven Emery, Emery Bros. 2003-2019
Foley-Baker Inc. 2019 (Antiphonal)

SOURCES: Aeolian-Skinner engineering and voicer files, with appreciation to Allen Kinzey. The historic documents are not in a condition conducive to facsimile reproduction, and are herein transcribed verbatim with minor editorial clarification in [brackets] and handwritten annotations in *italics*. Also *O.H.S. Philadelphia Convention Handbooks 1996, 2016;* Jonathan Ambrosino, and Steve Emery.

LEGEND: *m* is mouth-width, *Sc.* refers to standard scale numbers, *common* generally refers to a standard house scale unless used with the word "metal" to denote a body alloy containing approximately 28% tin. In its original conception, the Choir and Lady Chapel Screen organs were considered separate sections of the same department. Likewise the Positive and Bombarde shared the fourth manual as their home department. The String Organ originally played by transfers located in the stop jambs of each department, and since the 2002 console installation is accessed by tablets on the coupler rail. The stoplist below documents the information found on the Engineering Department's copy of the specification, with additions that reflect the present console resources following the organ's most recent restoration completed in 2019.

GREAT (II) – 3″ pressure throughout [75 mm]

16	Principal	61	*Sc. 36 - ¼ m - spotted - ½ on 17th, (lower 26 old pipes), lower 12 voiced 12/22/36*
8	Principal	61	*Sc. 43 - ¼ m - spotted - ½ on 18th, long flatting on upper lips, (lower 12 old pipes), 10 lower added 12/21/36. 4′ C up sent 1/11/37.*
8	Diapason	61	*Sc. 45 - 2/9 m - spotted - ½ on 17th*
8	Bourdon	61	*New metal Std. Diapason. Orig. Flute Harmonique crossed out.*
8	Gemshorn	61	*Common Flauto Dolce scale - spotted*
4	Principal	61	*Sc. 54 - ¼ m - spotted*
4	Octave	61	*Sc. 56 - ⅔ m - ½ on 18th*
4	Gemshorn	61	*4′ C up common Flauto Dolce - spotted*
2⅔	Quint	61	*Sc. 66 - ¼ m - spotted - ½ on 17th - 1′ C up cone tuned*
2	Super Octave	61	*Sc. 68 - ¼ m - spotted - ½ on 17th - 1′ C up cone tuned*
IV	Fourniture	244	*All 50 scale at 8′ C, ¼ m - ½ on 19th - Tin - cone tuned 1′ C up*
III	Cymbel	183	*All 50 scale at 8′ C - ¼ m - ½ on 19th - Tin - cone tuned 1′ C up*
III-V	Cornet	269	*Tierce repitched to 1⅓′ by Harrison on-site - citing as a reason "the room couldn't take a tierce."[1] Original factory composition restored in 2019. See Notes.*
8	Trompette-en-chamade		*Added 2002, Ant.*
4	Clarion-en-chamade		*Added 2002, Ant. extension*
	Chimes		
	[String Organ]		*Not on 2002 console*
	Great Unison Off		*Added 2002*

SWELL (III, enclosed) – 3¾″, stops marked with * are on 5″ pressure.

16	Flûte Conique	73	*Sc. 36 - s taper at top*
8	Geigen	73	*Sc. 46 - ¼ m - spotted - ½ on 18th*
8	Rohrflöte	*73	*Common metal Stp. Diapason [12 #1 Bass, 4 Gr. Bourdon, E= sc. 59] - ¼ m*
8	Viole-de-Gambe	73	*Sc. 56 - ¼ m - spotted*
8	Viole Celeste	73	*Sc. 56 - ¼ m - spotted, [full compass, tuned sharp]*

1. From GDH correspondence, conversation with Jonathan Ambrosino May 15, 2020.

4	Octave Geigen	* 73	*Sc. 58 - ¼ m - ½ on 18th - 1'C up cone tuned*
4	Fugara	* 73	*Sc. 65- ⅕ m - spotted*
4	Flute Triangulaire	* 73	*Common [scale] - new large bass [wood]*
2⅔	Nazard	* 61	*Common metal Std. Diap - ¼ m - tapered treble and open pipes*
2	Fifteenth	* 61	*Sc. 70 - ⅕ m - ½ on 18th, top 5 notes break back*
1⅗	Tierce	* 61	*see Notes*
III	Mixture	183	*see Notes*
III	Cymbel	* 183	*see Notes*
16	Bombarde	73	*Small scale (Cav-Coll Ch Trompette)*
8	Trompette	* 73	(1st) *French small (Cav-Coll)*
8	Trumpet	73	(2nd) *English small, English shallots*
4	Clairon	* 73	*French small (Cav-Coll)*
	Tremolo		
	[String Organ]		*Not on 2002 console*
16	Swell		
4	Swell		
	Swell Unison Off		*Added 2002*

POSITIV (I) – 2½″ wind [63 mm, unenclosed] *Originally assigned the fourth manual with the Bombarde.*

8	Singend Gedeckt	61	*12 #1 bass - 4' C up large wood Ged. To be carried up in stopped wood to top c - low cut-up. [A later notation: "Top 18 notes tin Chimney Flute". And later still: "Cor d'Nuit from 17 to 43, tin pipes, sent 1/14/37"]*
4	Prinzipal	61	*Sc. 56 - ¼ m - Tin - long flats on mouth -½ on 18th - very low cut-up - 1' C up cone tuned*
4	Koppelflöte	61	*As 940 [Church of the Advent, Boston] - body 55 scale - capped - Tin - very low cut-up. [The fourth rank of this type made and the first with capped basses 1-8.]*
2⅔	Nasat	61	*see Notes*
2	Blockflöte	61	*see Notes*
1⅗	Terz	61	*⅕ m - tapered, special scaling is page missing*
1⅓	Larigot	61	*"As Nazard - top octave repeats"*
1	Sifflöte	61	*⅙ m - tapered, special scaling page is missing*
IV	Scharff	244	*see Notes*
III	Zimbel	183	*see Notes*
	Tremolo		
	[String Organ]		*Not on 2002 console*
16	Positiv		*Added 2002*
	Positiv Unison Off		*Added 2002.*

CHOIR (I, enclosed) – 5″ pressure [128 mm]

16	Contra Viola	73	*Sc. 40 new pipes. Notation crossed out "old Swell Contra Gamba".*
8	Viola	73	*Sc. 52 - ¼ m - spotted*
8	Nachthorn	73	*#2 Melodia - 12 # open bass- 2 notes large at 4' C- Other 943 Great*
8	Dolcan	73	*Sc. 52 - ⅕ m - spotted*
8	Dolcan Celeste	61	*Sc. 52 - ⅕ m - spotted - [tenor-c, tuned sharp]*
4	Viola	73	*Sc. 64 - ⅕ m - spotted*
4	Zauberflöte	73	*As 940 - low 18 notes metal Rohr Flute [missing - replicated 2002]*
16	Krummhorn	73	*Common - light pressure shallots - no bells. [Originally intended as 8' Clarinet.]*
8	Trompette	73	*Small French (Cav-Coll)*
8	Trompette-en-chamade		*Added 2002, Ant.*
4	Clarion-en-chamade		*Added 2002, Ant. extension*
	Tremolo		
	[String Organ]		*Not on 2002 console*
16	Choir		
4	Choir		
	Choir Unison Off		*Added 2002*

BOMBARDE (IV, enclosed in Choir) – 7″ pressure [177 mm]

16	Posaune	61	*English Swell. Low 16′ C 4″ scale.*
8	Trumpet	61	*“*
4	Clarion	61	*“*
8	Trompette-en-chamade		*Added 2002, Ant.*
4	Clarion-en-chamade		*Added 2002, Ant. extension*
	[String Organ]		*Not on 2002 console*
	Bombarde Unison Off		*Added 2002*

SOLO (enclosed with String Organ, floating) – *This division and its controls were added by Cornel Zimmer in 2002 and retained in the present restoration.*

† 6″ pressure (153 mm)
†† 15″ pressure (380 mm)

8	Flauto Mirabilis† (t.c)	49	*Aeolian-Skinner, No. 155-A, reworked 2019*
8	Tuba††	73	*New, A.R. Schopp’s Son, revoiced Samuel C. Hughes*
8	French Horn†	73	*Skinner Organ Co., No. 601, reworked 2019, 5″ residence scale*
8	English Horn†	73	*Ernest Skinner & Son, No. 519, ca. 1939, reworked 2019, double-bell*
16	Solo		
4	Solo		
	Solo Unison Off		
	Tremolo		
	Chimes		

SCREEN (IV) – 4¼″ pressure [108 mm], unenclosed, floating. *A-S file states 4 1/8″ and simply notates this section as “Old”.* [Austin No. 69, 1902 – designed by Carlton Michell; labeled “16th Century Organ”] *Ochse quotes Ray Biswanger as stating that in 1937 under GDH “...the chorus was revoiced somewhat, today it has a Dutch sound”.*[2] *The Screen and Choir were originally conceived as two sections of one department, and coupled as a unit through the Choir intermanual couplers.*

8	Diapason	61	
8	Dulciana	61	[*Pure tin*]
4	Gemshorn	61	[*Pure tin*]
2⅔	Nazard	61	[*Pure tin. Originally Lieblich Flöte 8′, repitched by GDH, possibly on-site – “19 new top notes sent 1/19/37″.*]
2	Piccolo	61	[*Pure tin*]
	Screen 16,4		*Added 2002: the 16 and 4 intermanual couple through the manual transfers.*
	Screen Unison Off		*Added 2002*

STRING ORGAN (enclosed attic, floating) – 7″ Pressure [177 mm] *Installed 1922 by Wanamaker Organ Co. with pipes supplied by W.W. Kimball, placed on Wanamaker/Fleming windchests, although Harrison believed the pipes to be by Welte.*[3] *A-S Engineering notes state “Pipes to be revoiced”.*

16	Viole	73	
8	Flute	73	*[open wood pipes, stopped bass, inverted mouths]*
8	Orchestral Strings II	146	*“All 75 scale”*
8	Dulcet II	146	*“Loudest”*
8	Dulciana	73	*“Old, 4′ C up Fl Dolce slightly arched.”*
8	Dulciana Celeste II	146	*Originally labelled* Muted Strings II
4	Viole	73	
16	Vox Humana	ext. 12	
8	Vox Humana	61	
	Tremolo		

2. *Austin Organs,* Orpha Ochse; Organ Historical Society, Richmond, 2001. 69
3. Conversation with Jonathan Ambrosino, May 15, 2020.

	[Chimes]		*Crossed out on 1937 Engineering stoplist*
16	String		
4	String		*The 16 and 4 intermanual couple through the manual transfers.*
	String Unison Off		*Added 2002*

ANTIPHONAL *New 2019, rear gallery, replaced 2002 Grand Choeur I & II*
(enclosed, floating) – 5″ pressure [128 mm] *Aeolian-Skinner pipework 1953-1956, installed in 2002, reworked 2019*

8	Principal	61	
8	Bourdon	61	
4	Octave	61	
2⅔	Twelfth	61	
2	Fifteenth	61	
8	Hautbois	61	
	Tremolo		
8	Trompette-en-chamade	61	*New 2001, extension*
4	Clarion-en-chamade		*New 2001*

PEDAL – 5″ pressure, 7″ Bombarde [128, 157 mm}

32	Sub Principal [digital]		*New 2002, Walker digital*
32	Bourdon [digital]		*New 2002, Walker digital*
16	Principal	32	*Sc. 26 graduating to 42 at 8′ C - 2/9 m - long feet - 4′ C up spotted metal*
16	Contre Basse	32	*62 x 70 - 24 wood, 8 metal - 4′ C sc. 60. ~~Old~~*
16	Violone	32	*Sc. 46 ~~Old~~*
16	Subbass	32	*"Old Pedal Bourdon"*
16	Flûte Conique (Sw.)		
16	Contra Viola (Ch.)		
16	Viole	32	*"Enclosed in String Organ"*
16	Bourdon (Ant.)		*Installed 2019*
8	Principal	32	*Sc. 43 - ⅔ m - 4′ C up spotted*
8	Nachthorn	32	*#2 Melodia - 12 #2 Melodia open bass - Tin 4′ C up, special slow scale*
8	Flûte Conique (Sw.)		
8	Viola (Ch.)		
5⅓	Quint	32	*Sc. 52 - ¼ m - zinc & spotted - straight pipes*
4	Principal	32	*Sc. 54 - ¼ m - spotted*
4	Flûte Harmonique	32	*Sc. 64 - E.M.S. Har. Flute #2*
2	Blockflöte	32	*¼ m - Tin- tapered, special scaling page missing*
III	Mixture	96	*see Notes*
II	Cymbal	64	*see Notes*
32	Posaune	ext. 12	*CCC 9" sc. to meet CC*
16	Bombarde	32	*6" sc. at 16′ C*
16	Posaune (Bomb.)		
8	Trompette	32	*Eng. medium*
4	Clairon	32	*Eng. Medium*
8	Trompette-en-chamade		*Added 2002, Ant.*
4	Clarion-en-chamade		*Added 2002, Ant extension.*
	Chimes		

ORIGINAL COUPLERS

Swell to Great 16, 8, 4
Choir to Great 16, 8, 4
Positive to Great 16, 8
Bombarde/Solo to Great 8 *All Solo coupling functions added 2002*

Positiv to Swell 16, 8	
Swell to Choir 16, 8, 4	
[Positive to Choir 16, 8]	*Removed as superfluous on 2002 console*
Great to Pedal 8	
Swell to Pedal 8,4	
Choir to Pedal 8,4	
Positiv to Pedal 8	
Bombarde/Solo to Pedal 8,4	*4′ added 2002*
Screen to Pedal 8,4	*4′ added 2002*
String to Pedal 8,4	*4′ added 2002*

Couplers added on 2002 console, Antiphonal couplers added 2019

Screen on Great	Great to Choir 8
String on Great	Bombarde/Solo to Choir 8
Antiphonal on Great	Screen on Choir 8
	String on Choir
Choir to Swell 16, 8, 4	Antiphonal on Choir
Bombarde/Solo to Swell 8	
Screen on Swell	Positive to Bombarde 8
String on Swell	String on Bombarde
Antiphonal on Swell	Antiphonal on Bombarde
	Antiphonal to Pedal 8

CONSOLE EQUIPMENT

Expression Pedals: 2002 – Antiphonal, Choir, Swell, String/Solo; Crescendo. (Original order – String, Choir, Swell; Cresecendo). *The organist at the time of the 1937 installation was H. William Hawke, who had a wooden right leg. The expression pedals in the original console were shifted to the left of normal position to accommodate his disability. There was also a metal bracket that separated the Swell and Crescendo pedals, perhaps so he could quickly find the Swell shoe without looking, simply by swinging his apparatus about.*[1]

Pistons	*Toe controls*
Divisionals and general pistons	Sforzando
Coupler Reversibles	General and Divisional toe studs
General Cancel	Coupler reversibles
Setter	

GENERAL

Compass 61 note manuals, 32 note pedals.

Console: 2002 Cornel Zimmer, A.G.O specifications, drawknob. Modified 2018-19 by Steven Emery and Foley-Baker, Inc.

Casework: Austin Screen Organ, chancel redesigned by Henry Vaughn, 1902; main case and chancel furniture by Irving & Casson (Boston), installed 1905. Antiphonal, 2002.

Previous organs: Hall & Labagh 1849 and a new organ 1869 3-51 with Barker machine; modified Hilborne Roosevelt 1881 (extant in storage); Austin Organ Co. designed by Carlton Michell No. 69 in 1902.

Control System: Walker Technical, 2002

Blowers: Main, Spencer *Orgo-blo*

Pitch: A440, Equal Temperament

Location: Front chancel chambers, originally occupied by the 1902 Austin, 1922 String Chamber constructed in the attic, and 2019 Antiphonal organ is installed inside the 2002 Grand Choeur casework.

Consultant: Jonathan Ambrosino

1. Conversation with Jonathan Ambrosino, May 18, 2020

NOTES

THE ORGAN WAS TONALLY FINISHED BY G. DONALD HARRISON personally; using a portable keyboard he could access while sitting in the nave.

The String and Screen divisions, added by the Wanamaker shop in 1922 and 1927, were retained by Aeolian-Skinner. During tonal finishing in 1937, G. Donald Harrison recomposed the Great III-V Mixture to remove third-sounding ranks. In the 1980s, the factory composition was reinstated.

The Screen originally played from manual I, the Positiv from manual IV. In 1967, Austin Organs, Inc., provided a new drawknob console, in which the Screen now played from manual IV, the Positiv from manual I. This arrangement was preserved in the present console, installed in 2002 by Cornel Zimmer, during a renovation that included the reversal of one changed rank in the Choir, the introduction of vintage Skinner ranks and a new Tuba in the String, and a hybrid digital-pipe Antiphonal in new west end casework designed by Davis d'Ambly.

In the current restoration effort, the Antiphonal was completely reworked with vintage pipes and new mechanisms, by Foley-Baker, Inc., of Tolland, Connecticut. The Swell division had already been restored by Emery Bros. in 2003; the current restoration has addressed the rest of the organ. All reeds have been restored by Samuel C. Hughes. Stephen L. Emery reinstalled the restored organ, reviewed all pipes for speech and timbre in the workshop, and performed the final on-site tonal finishing with project consultant Jonathan Ambrosino.

ST. MARK'S CHURCH

Great Fourniture IV rks. — *All 50 scale at 8' C, ¼ m - ½ on 19th - Tin - cone tuned 1' C up*

C	2	1⅓	1	⅔	12 notes
c^0	2⅔	2	1⅓	1	18 notes
$f\sharp^1$	4	2⅔	2	1⅓	6 notes
c^2	8	4	2⅔	2	18 notes
$f\sharp^3$	Sub	8	5⅓	4	7 notes

Great Cymbel III rks. — *All 50 scale at 8' C - ¼ m - ½ on 19th - Tin - cone tuned 1' C up*

C	1	⅔	½	18 notes
$f\sharp^0$	1⅓	1	⅔	12 notes
$f\sharp^1$	2	1⅓	1	6 notes
c^2	2⅔	2	1⅓	6 notes
$f\sharp^2$	4	2⅔	2	12 notes
$f\sharp^3$	8	4	2⅔	6 notes

Great Cornet III-V rks. — *Original disposition. Unisons and quints sc. 44 at 8' C, ¼ m - ½ on 18th - ¼ m - Tierce sc. 74 at 8' C; 1/5 m - ½ on 19th. All tin, cone tuned 1' C up. Pencil alterations to original composition shown in [ ], i.e. tierce changed to nineteenth on-site during installation.*

C				2⅔	2	1⅗ [1⅓]	12 notes
c^0			4	2⅔	2	1⅗ [1⅓]	12 notes
c^1		8	4	2⅔	2	1⅗ [1⅓]	24 notes [32 notes]
$g\sharp^3$	Sub	8	4	2⅔	2		13 notes [5 notes]

Swell Mixture III rks. — *All 48 scale at 8' - ¼ m - spotted - ½ on 19th - cone tuned*

C	1⅓	1	⅔	12 notes
c^0	2	1⅓	1	18 notes
$f\sharp^1$	2⅔	2	1⅓	12 notes
$f\sharp^2$	4	2⅔	2	6 notes
c^3	8	4	2⅔	13 notes

Swell Cymbal III rks. (orig. called Scharff) — *All 50 scale at 8' C - ¼ m - spotted - ½ on 18th - coned*

C	½	⅓	¼	12 notes
c^0	⅔	½	⅓	6 notes
$f\sharp^0$	1	⅔	½	6 notes
c^1	1⅓	1	⅔	6 notes
$f\sharp^1$	2	1⅓	1	6 notes
c^2	2⅔	2	1⅓	6 notes
$f\sharp^2$	4	2⅔	2	19 notes

Swell Tierce 1⅗′ (tapered)

C sc. 66 at mouth,⅔ diam. at top - spotted - very low cut-up
c^0 sc. 78 at mouth "
c^1 sc. 90 at mouth "
c^2 sc. 106, straight pipes
c^3 sc. 120, straight pipes; top octave repeats

Positiv Scharff IV rks. — *All 48 scale at 8' C -1/4 m - Tin - ½ on 19th. In the top octave, where there are two Diapasons and two Octaves the scales should be varied two scales to the respective similar ranks.*

C	1⅓	1	⅔	½	12 notes

c^0	2	1⅓	1	⅔	6 notes
$f\sharp^0$	2⅔	2	1⅓	1	12 notes
$f\sharp^1$	4	2⅔	2	1⅓	6 notes
c^2	8	4	2⅔	2	12 notes
c^3	8	8	4	4	13 notes

Positiv Zimbel III rks.

All 48 scale at 8′ C - 1/5 m - ½ on 17th - Tin - coned. As specified by Engineering department with the handwritten notation, "this layout is not as Zimbel 948". Modified during installation.

"As was"

C	¼	⅙	⅛	12 notes
c^0	½	⅓	¼	12 notes
c^1	1	⅔	½	12 notes
c^2	2	1⅓	1	12 notes
c^3	4	2⅔	2	13 notes

"As built"

C	¼	⅙	⅛	6 notes
$F\sharp$	⅓	¼	⅙	6 notes
c^0	½	⅓	¼	6 notes
$f\sharp^0$	⅔	½	⅓	6 notes
c^1	1	⅔	½	6 notes
$f\sharp^1$	1⅓	1	⅔	6 notes
c^2	2	1⅓	1	6 notes
$f\sharp^2$	2⅔	2	1⅓	6 notes
c^3	4	2⅔	1	13 notes

Positiv Nasat 2⅔′ (tapered)

¼ m - Tin - low octave tuners, rest coned - very low cut-up
C Sc. 60 at mouth,⅔ at top
c^0 Sc. 66 " *c^1 Sc. 78 "*
c^2 Sc. 90 "
c^3 Sc. 102 "
c^4 Sc. 120, straight pipes top octave

Positiv Blockflöte 2′ (tapered)

¼ m - Tin - low cut-up - coned
C Sc. 65 at mouth,⅔ at top
c^0 Sc. 72 "
c^1 Sc. 84 "
c^2 Sc. 96 "
c^3 Sc. 112 "
c^4 Sc. 128, straight pipes top octave

Pedal Mixture III rks.

Sc. 64/66/68 - ¼ m - spotted - ½ on 19th - no breaks [At 8′ respectively: 48/47/44]

C	3⅕	2⅔	2

Pedal Cymbal II rks.

Sc. 80/82 - ¼ m - spotted - ½ on 19th - no breaks [Same scales at 8′ as Mixture]

C	1⅓	1

ST. MARK'S CHURCH

ESSAY BY **JONATHAN AMBROSINO**

> You will be interested to hear that we are now installing the new organ for St. Mark's, Philadelphia, and I hope it will be a decided advance on Groton and Advent. The Positiv is much more complete, and I have introduced an old-fashioned type of Krummhorn in place of the original Clarinet. This stop will be at 16′ pitch. I suppose that E.M. would refer to the bass as "a well organized rattle," but, nonetheless, I like it!
>
> —G. Donald Harrison to William King Covell, November 19, 1936

DONALD HARRISON'S REFORMS OF THE 1930S ARE BEGUILING, since Harrison himself rarely came out of the limelight to tell his public what he is doing. Adhering to the philosophy of "Work like hell and stay out of print" (advice he would later give his son Michael), Harrison gives every impression of letting the instruments alone be his intellectual advocates. As well, Harrison relied upon his friends to choreograph public reception of his work. Examining that process helps to highlight some of Harrison's motivations, and with it the reforms he was so concerned to put over.

Take Harrison's writings and lectures: hardly any exist. In his first decade in this country, he wrote precisely two articles of importance, granted one published interview, and lectured at the Chicago National Association of Organists Convention in 1933. For the most important reformer of his day, this reticence is significant. On the other hand, Harrison's advocates never seemed to stop crusading. Barely an issue of *The American Organist* appeared without a message from the era's apostles of reform: William King Covell, Senator Emerson Richards, Edward Flint, Edward Gammons, Ernest White, extolling either a specific Aeolian-Skinner or the virtues of the style those organs espoused. We know that Covell's writings, at least, rarely appeared in print without Harrison's review and comment; sometimes their very existence was suggested by him.

In the organs themselves, Harrison's reforms unfolded as a continuum of new features, popping up one after another as might that year's new car options. Not only did this process allow Harrison gradual experimentation with new ideas, it supplied considerable fodder for public discourse, at a time when organ production was dramatically reduced from the heady late 1920s, and the emerging styles of both Walter Holtkamp, Sr., and G. Donald Harrison made a ready topic for organ journalism. Even someone who had never heard an Aeolian-Skinner would have had much to contemplate, as wind-pressures crept down, spotted metal and tin overtook lead and zinc, multiple mixtures usurped Great chorus reeds, and independent Pedal divisions began to rival and occasionally exceed the size of their respective Greats. In Harrison's case, ingrained conservatism kept his developments controlled and likable. One sees this especially in the early Positivs, whose mixtures were kept purposely low in pitch, so as not to feed into any pre-conceived notion of what such divisions might be about.

Through it all, nomenclature such as *Trumpet*, *Clarinet* and *Mixture* gave way to *Trompette*, *Krummhorn* and *Cymbel*. The large instruments no longer had nine or ten celestes, but nine or ten mixtures, with mutations extending to one-foot and often several tierce possibilities. Yet for all the seemingly revolutionary ideas, the organs themselves became demonstrably less assertive. Organs that people feared would be screechy and overly brilliant turned out to be neither; the Groton and Advent organs, drawn fully, were no louder than many 1920s instruments' mezzo fortes–a subtle twist and perhaps Harrison's greatest stroke. Coming just ten years after Harrison's arrival in the United States, the Saint Mark's organ would be astonishing for nothing other than the strides it represented.

In the 20th-century Saint Mark's Philadelphia has been no stranger to cutting-edge organs. The instrument has always been in the vanguard, from the 1904 Austin designed by Carlton Michell (its unenclosed encased section on the screen being a "positiv" of sorts well before such things were fashionable), to the 1922 String Organ (gift of parishioner Rodman Wanamaker, constructed in the Wanamaker organ shop and using pipes by W.W. Kimball) and the 1927 West End division by Midmer-Losh. The last was designed and built under the direction of Senator Emerson Richards of Atlantic City, the inspiration being Edmund Schulze, the German organbuilder whose most famous work revolutionized English thought from the 1860s through the 1880s.

The Midmer-Losh work was much written up at the time, and the contrast between it and the new Aeolian-Skinner of 1937 highlights a key turning point in pre-World War II organ reform. Early reform stemmed perhaps less from strict musical motivations–providing sounds, choruses and an ensemble that made sense for a particular kind of music–and more from tonal ones: searching for a brighter, less cloying ensemble. In this pursuit, English organs were held up as a model for emulation, with emphasis on the reeds of Willis and the choruses of Schulze. If Richards' desire to create a Schulzian chorus was ultimately out of place (Schulze's heroic style would seem to have little in common with the intimate environment at Saint Mark's), it was at least in vogue.

Richards soon moved past this "tonal" phase to a more musical orientation, and in so doing allied himself with a new generation whose interests in older organ music, particularly that of Bach, were sincere and strong. It was only a matter of time before emphasis shifted from England to Germany in the pursuit of polyphonically suitable models. Once again Richards led the way, being the first prominent figure allied with organbuilding to make the pilgrimage to *Deutschland*. Harrison finally did so in April 1936, with organist Carl Weinrich (Princeton University, Westminster Choir College). The Aeolian-Skinner for Saint Mark's was the first significant organ to result from that trip.

Opus 948 is unrivaled as an authentic showcase of Harrison's early mature style, including many sounds and concepts currently unavailable for audition elsewhere. Two defining characteristics of this brief period (late 1935 to late 1937) are the twin-chorused Great and the large Positiv with low-pitched chorus mixture.

The twin-chorused Great is characterized by the balance of the chorus registers and the careful differentiation of the mixtures. In this setup, the Principals 8 ft. and 4 ft. are the primary elements, the Diapason 8 ft. and 4 ft. are the secondary. The 16 ft., 2⅔ ft. and 2 ft. accommodate either, with the 16 ft. a bit more in the secondary league, 2⅔ ft. and 2 ft. more in the primary. While higher-pitched than the Fourniture, the Cymbel is less of a clear-cut four-foot series mixture, more a lean alternative to the meaty Fourniture; it handsomely tops the lighter Diapason and Octave into a fine secondary chorus. The cleanly-voiced wide-scale Fourniture is not a cloying stop as some later Aeolian-Skinner examples could be, but the heart of the chorus, giving richness, texture and clarity. The Full Mixture takes the place of a chorus trumpet, lending body and tang to full Great. Originally containing a tierce (as with its sister Sesquialtera IV-V at Boston's Church of the Advent), the Full Mixture was recomposed during the 1937 finishing, omitting all third-sounding ranks. During his tenure, organist Wesley Parrott re-introduced the tierces. Even with its major and minor elements, no one rank is far from the other. The Bourdon is a broad-scale chimney flute, while the Gemshorns are delicate Flautos Dolce.

If Great chorus is the anchor of the instrument, defining and centering the ensemble at every turn, the Pedal is its equal, having just enough edge, particularly in the reeds, to suggest an authority without loudness. The reeds are at a volume where individually they can serve in trio or cantus firmus roles, while binding together in an aggressive melodic battery when needed; the 32ft. octave is admirably prompt.

The ten-stop Positiv contains both the only playable example of Harrison's early low-pitched Positiv mixtures and the first of his high-pitched repeating mixtures. The possibilities such registers afforded quite excited Ernest White, who reported on the organ in the April 1937 edition of *The Diapason:*

> The most striking feature of the stoplist is the number of mixture ranks. Heretofore in describing tone from many ranks of mixtures the expression in vogue was "the organ has a blaze of mixtures." That expression here would be misleading, for the mixtures do not provide aggressiveness and sparks in the form of top tone: they are in the truest sense the organ. The three great mixtures sound as if their combined tone were of 8-foot pitch, but of exceptional clarity and intensity.

Another first at Saint Mark's is the Choir 16 ft. Krummhorn. Indeed, the stringent absence of color reeds is typical of this period, where two trumpets are to be found in place of the more conventional Swell trumpet-oboe duo. If only one color reed seemed almost like a dare in a 104-rank organ, the reformers had a rationale for it. Wrote Ernest White of the Positiv:

> ...it is an orchestral-sounding solo organ. We have been accustomed to thinking of the orchestral type of tone as coming from sets of pipes made exclusively for that purpose. Here the Krummhorn is a double for the Wagnerian English Horn; yet it was developed as a chorus reed. The positiv nasat and terz together with the gedeckt make a truly orchestral oboe... Aside from its original purpose this positive organ is the equal of any twenty-stop solo organ. The division is unenclosed, but the tone is so clear that it can be phrased and molded by the key-touch so that were a box provided it would remain unused.

Harrison's pioneering Massachusetts organs were blank slates: he was given *carte blanche* within the available funds. The assignment at Saint Mark's came with the stipulation that the String and Screen sections specifically be retained. The String Organ pipes may have been reined in a touch, to make them more in keeping with the whole; a few stops in the Screen Section were shifted in pitch. The remaining departments, however, were pure Harrison, with independence at all pitches on all keyboards and pedals, an emphasis on principal choruses over reeds, complexity over loudness.

Such an organ was not for everyone. The stoplist almost seemed to suggest its players cast aside certain tropes of how music should be rendered, particularly in the accompaniment of Psalms and anthems. Still, the conviction of its choruses and cohesiveness of its ensemble tended to make converts. The instrument's first organist, William Hawke, thought the organ superb and changed nothing. His successor, Wesley Day, worked to mark Opus 948 as an instrument of historic significance, winning for it the Organ Historical Society Citation No. 36, the first awarded to an Aeolian-Skinner. But he did bring about three changes: first, removing façade pipes and some woodwork to increase the impact of the Great; second, swapping out one stop–the Choir 4 ft. Zauberflöte–for a 4 ft. Rohrschalmei; third, commissioning a new console from Austin Organs, Inc., in 1965. In Wesley Parrott's time, once again the notion surfaced that the organ was under-served in the imitative reed direction. To that end, Parrott acquired several vintage Skinner orchestral reeds for eventual installation.

The 2000-02 project by Cornel Zimmer, with the tonal direction of Daniel Angerstein, considered these changes in a new light. The removed façade pipes and casework hadn't really made the organ clearer, merely upset the balance by over-stressing the Great. The Zimmer team provided new façade pipes and recreated missing case pieces. Other work followed in a similar vein. A new four-manual console was provided, more in keeping with Aeolian-Skinner norms than the Austin one. The Choir Zauberflöte was replicated, and

ST. MARK'S CHURCH

Wesley Parrott's collection of reeds reconditioned and installed in the String, together with a new Tuba.

The most significant addition, however, was a west end department called *Grand Choeur*, intended both to support congregational singing and to provide color possibilities thought lacking in the main instrument. The tones here were produced partly by pipes, partly by digital production[1]. The crowning touch was a Trompette-en-chamade, horizontal pipes lying down between the two cases. With this program of change and embellishment, however, nothing was done to the central mechanism or pipework of the main organ, and in time, it became necessary to perform the usual refurbishment of wind system, windchests, and pipework.

From the 1980s, one man has seen to the care of this instrument: Stephen Emery. A passionate believer in its historic importance and beautiful ensemble, Mr. Emery has been its most careful guardian and ongoing restorer. Beginning in 2000, he oversaw Samuel C. Hughes' restoration of many of the reeds, before the Emery shop restored the entire Swell in 2002. In 2013, Emery Bros. restored the Screen section while work was being undertaken in the Lady Chapel. The most recent restoration was undertaken between 2017 and 2019 by Emery Bros. (whose ownership transferred to Adam Dieffenbach in 2016) and Steve Emery continuing with his own crew.

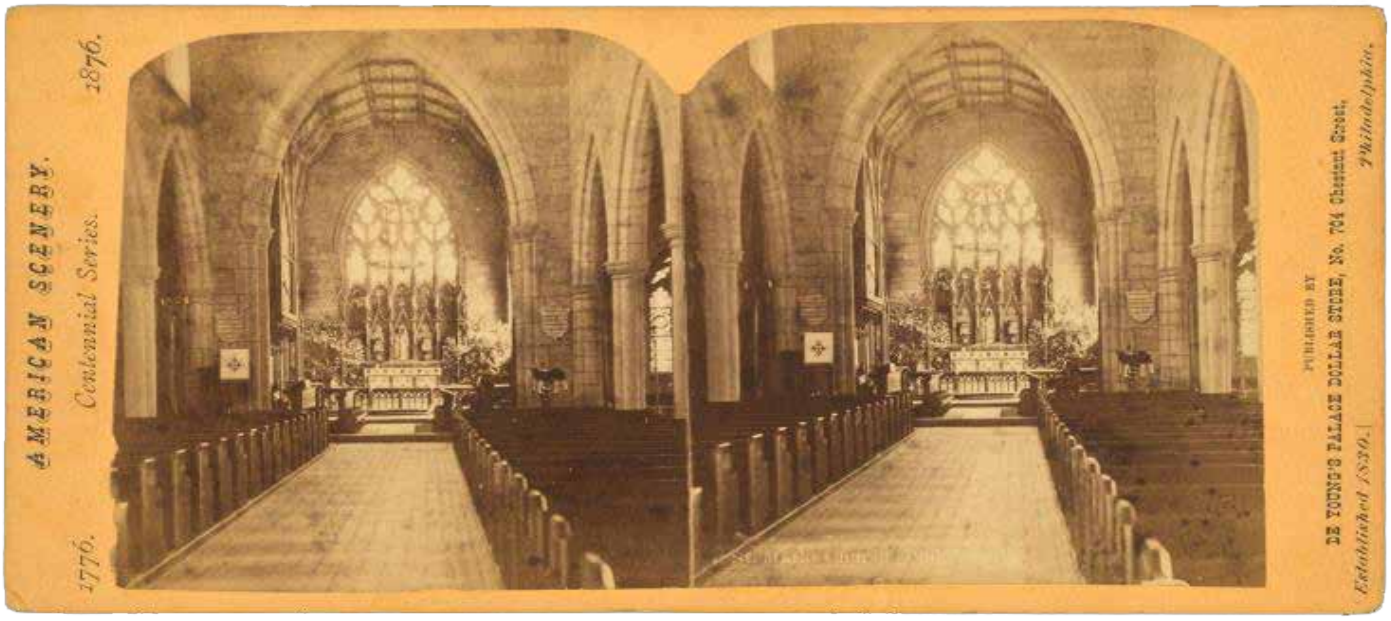
The Emery shop removed the organ and reinstalled key elements, and coordinated shop work; Steve Emery oversaw and coordinated much restoration work, reviewed all pipes in the workshop, and did all re-installation. Any reed stop not previously overhauled was done now, again by Sam Hughes. Emery performed the tonal finishing personally, assisted by Jonathan Ambrosino.

During this project, key aspects of the 2000-02 work were reconsidered. The solo voices in the String Organ were re-thought and rearranged. Sam Hughes reconditioned the English and French horns and revoiced the Tuba. These three stops were placed on new windchests by A.R. Schopp's Sons, re-sited for improved tuning and maintenance access. The Flauto Mirabilis, introduced in the Zimmer Grand Choeur, was relocated to the String as a tenor-c register. The surfeit of digital voices was reduced to two Pedal 32-foot flue effects, harp, and chimes.

At the west end, the 2000-02 cases, swell enclosure, chamade, and much of the wind system were retained. Foley-Baker designed and provided a new chassis, with chests by Organ Supply Industries, and arranged upon them six Aeolian-Skinner ranks (1953, 1956) sourced by Ambrosino. These elements form a simple chorus with supplemental Bourdon, Hautbois and basic Pedal. Philip Carpenter supervised the work, and Milovan Popovic oversaw pipework reconditioning. Rechristened "Antiphonal," this department now resembles the straightforward, congregationally-supportive departments G. Donald Harrison provided on later instruments, and with sounds he would recognize.

The church aims to complete this effort by simplifying or replacing the present console, and introducing humidification. Steve Emery maintains and tunes the instrument.

1. The addition of digital voices violated the tenets of the O.H.S. Citation that instrument owners agree to when accepting a Citation. This caused the Citation to be rescinded. An application is pending to have the Citation reinstated following the recent restoration of the instrument and the removal of the digital voices. [editor]



ABOVE: 1876 stereo slide, showing the Hall & Labagh-Roosevelt case.

OPPOSITE: The rear-facing and polychromed facade of the double-fronted 1902 Screen Organ, speaking into the Cope & Stewardson Lady Chapel, a memorial to Rodman Wanamakers late wife Fernanda. PHOTO: Bryan Dunnewald

ST. MARK'S CHURCH

St. Mark's Episcopal Church
Philadelphia, Pennsylvania
Midmer-Losh, Inc. 1926
Consultant: Emerson Richards

SOURCE: *Charles Brenton Fisk: Organ Builder,* "Commander-in-Chief of the American Revolution in Organbuilding, Emerson Richards", by David Fuller; The Westfield Center (1986), 55-84; Stephen Smith, *Atlantic City's Musical Masterpiece;* Peter Randall, Portsmouth, N.H. 2002

WEST END DIAPASON ORGAN

61 notes, unenclosed, 7½″ wind unless specified

32′	Dulciana (t.c.)	Unit 1
16′	Diapason	3¾″ wind
16′	Dulciana	Unit 1
8′	Diapason I	12″ wind
8′	Diapason II	
8′	Diapason III	3¾″ wind
8′	Diapason IV	3¾″ wind
8′	Flute Harmonic	
8′	Flute Overte	3¾″ wind
8′	Waldhorn	special scale, tapered flue
8′	Viol d'Gamba	
8′	Dulciana	Unit 1
4′	Octave	3¾″ wind
4′	Flute Harmonic	
4′	Dolce	Unit 2
2′	Fifteenth	3¾″ wind
2′	Dulcet	Unit 2
1′	Dulcinett	Unit 2
II	Rauschquint	3¾″ wind , 4′, 2⅔′
V	Mixture (Schulze)	3¾″ wind, see essay
VII	Grand Cornet	Enclosed; at unison or the octave; separately drawable pitches
	8′	Unison
	5⅓′	Fifth
	4′	Octave
	3⅕′	Tenth
	2⅔′	Twelfth
	2⅐′	Fourteenth
	2′	Fifteenth
16′	Contra Tromba	20″ wind
8′	Tromba Harmonic	20″ wind
4′	Clarion Harmonic	20″ wind

ANTIPHONAL PEDAL 32 notes

16′	Diapason	Great
16′	Dulciana	Unit 1
32′	Bombard	Unit 3, 20″ wind
16′	Trombone	Unit 3, 20″ wind

ESSAY BY SCOT HUNTINGTON

THE FOURTH CHANCEL ORGAN WAS A 1902 AUSTIN, NO. 69, augmented with the subsequent installation of a 1922 String Division (9 stops-11 ranks) of W.W. Kimball pipes, and installed by the Wanamaker Organ Shop in the attic over the main organ. Following a visit by the St. Mark's organ committee to the Atlantic City High School organ, by which they were very impressed with the low-pressure diapason chorus, then a new novelty, they engaged the Senator as their consultant to design an Antiphonal organ to bolster congregational singing in the main portion of the nave. Inspired by the work of George Ashdown Audsley, the first consultant for the Antiphonal project, who had initially proposed a large west-end Diapason Organ for St. Mark's prior to his death in 1925, Richards planned a singularly large unenclosed division of 28 stops housed in a carved Neo-gothic case, costing an impressive $25,000. It was built by Midmer-Losh, with whom Richards now had a willing builder partner in his revolutionary schemes. The organ however, was by all accounts poorly built of cheap materials, already having cipher problems within three years, and was ultimately removed entirely by Aeolian-Skinner just eleven years later with the arrival of their new chancel organ in 1937. While no definitive stoplist for this division has yet surfaced, the above stoplist is a compilation of the contract in church files and a detailed but mildly critical description in *The American Organist* written by William H. Barnes.

Richards designed this division with two complete diapason choruses, one of high pressure and contemporary, Anglo-American orchestral voicing, and the second based on the classically-designed low-pressure chorus at Armley, England, built in 1868 by the Thuringian builder Edmond Schulze. With the exception of the large Grand Cornet, the entirety of the large Diapason Organ was unenclosed, for which Richards was taken to task in the press. He was apparently touchy about the subject in his public correspondence, opining only that enclosure would have taken the "shine" off the chorus. On paper, the division appears to be a *multim-im-parvo* distillation of the High School choruses, with multiple choruses of high and low pressure diapasons, one of soft string tone, and one of heavy reed tone.

Contemporary accounts and the church's persistent oral legend suggest the division's effect in this intimate acoustic was shattering. The Senator was possibly the only one who considered it a success, but William H. Barnes, another self-styled organ architect of the period, considered it a "... landmark in American organ design"[1], although he and Richards debated the lack of enclosure in several editorial exchanges. The church's organist (1929-1945), H. William Hawke, was less charitable, calling it "... a failure from the start, both tonally and mechanically. [By 1929] it was a wreck, the workmanship was cheap and poor, and the finishing crudely done... But there

1. *The American Organist,* April 1927

were a couple of redeeming features, if they had been properly finished..."[2]. Parts of the West End diapason chorus, and specifically the "Schulze" *Mixture* ended up in the Senator's rebuilt four-manual house organ (Aeolian-Skinner No. 1047, 107 stops, 139 ranks, 1944), for which Richards modified the mixture's breaking pattern.[3] Even George Losh, one of the organ company principals, thought the unenclosed position in the corners of a stone room that is easy for music making, made the organ "oppressively loud" and the copy of the famed English mixture was, not surprisingly, "overbearing".[4]

The Schulze chorus at St. Bartholomew, Armley, didn't generate much excitement in its original private residential home, and it wasn't until it was moved to the large, reverberant stone Armley church, that the blazing brilliance from its Great mixture first grabbed attention, and set organbuilder imaginations aflame. For a German organbuilder, there was nothing particularly secretive about it: high tin content, heavy walls, wide quarter-plus mouth widths, quarter cut-up, generously winded at the toe and windway and fully blown to the limit of the cut-up, straight line scaling in all ranks with identical voicing of all pitches, and quick voicing/languid placement on tone-channel chests. The sonic result would not have been foreign to Schnitger or Silbermann, but would have been to later generations appreciative of cigars and brandy organ tone. Even today, some listeners find this mixture's effect in the Armley full ensemble to be "annihilating". The original Armley mixture composition is as follows, its octave breaks being especially unpopular with musicians, then, and now (at St. Mark's the third and final break occurring earlier at $c^{\#2}$ was even worse):

C	2	1⅓	1	⅔	½
g^0	4	2⅔	2	1⅓	1
g^2	8	5⅓	4	2⅔	2
g^3	8	5⅓	4	2⅔	—

When Richards later recomposed the mixture for his house organ, with fifth instead of octave breaks, he also had the fifth-sounding ranks softened below the strength of the unisons to make the tone more silvery and less intense.

The special Gemshorn-esque scale devised by Richards for the *Waldhorn*, made its debut in this instrument, and reappears prominently in the Convention Hall organ several years later. While Richards considered it a hybrid between diapason and gamba tone, its construction and general tone was not unlike that of W.W. Kimball's period rank of the same name, only louder.

2. *Organ Handbook, 1996, Philadelphia;* Organ Historical Society, Richmond, 40

3. Following a fire which seriously damaged the home in 1948, the organ was rebuilt and sold to the First Baptist Church, Denver, Colorado (A-S Op. 1047A, extant). This was replaced in the Senator's rebuilt home in 1953, with Organ No. 1269, 132 ranks, a mixture of A-S and Steinmeyer pipework. This organ too perished in another fire several years later.

4. Stephen Smith; *Atlantic City's Musical Masterpiece,* Peter Randall, Portsmouth, N.H.: 429.

The Senator believed an organ should have a variety of eight-foot diapason tone, graduated in power and harmonic development, beginning with the narrow-mouth, leathered Hope-Jones variety as No. 1, No. 2 might typically be an unleathered, heavy walled and fully-winded stop of similarly British and symphonic heritage, and followed thereafter by a cascade of lighter, more classical diapasons based on Schulze and "baroque" examples. *The Grand Cornet* was a precursor to the harmonic series exploration Richards fully realizes in the Convention Hall organ, with the ranks separately available as they were in the High School organ, and the whole available either at "unison" as the sixteen-foot harmonic series, or at the "octave" as the eight-foot series.

The need for a West End division in this church has been clear to a succession of organbuilders working here–the gentle voicing of the chancel organs being an integral component of the music making happening there and in forward parts of the building. The comparatively mild voicing of the 2019 antiphonal division in this intimate space, shows only a light hand is needed here, and makes it fair to ask, what was Emerson Richards thinking?

The Gothic-Revival oak case of the West End organ, designed by Charles L. Borie and built by Midmer-Losh. CREDIT: *Under the Sassafrass Tree,* Midmer-Losh promotional brochure, ca. 1928

GREEK HALL

GREEK HALL WURLITZER

Macy's Department Store
Philadelphia, Pennsylvania

RUDOLF WURLITZER MANUFACTURING CO.

North Tonawanda New York
Wurlitzer Hope-Jones Unit Orchestra Style 190
2 Manuals - 8 Ranks - 4 Tuned Percussions - 18 Traps
Opus 2070, 1929

Original home: Fox (Rio) Theatre, Appleton, Wisconsin
Current installation: 2013, Curt Mangel and the Friends of the Wanamaker Organ

CHAMBER ANALYSIS

MAIN

16-4	Diaphonic Diapason	73 pipes	1-12 metal Diaphone; then zinc and Hoyt metal, with leathered lips to 49
8	Clarinet	61 pipes	½-L cylindrical, Hoyt metal, flue trebles
8-4	Violin	73 pipes	Salicional scale, zinc basses then spotted metal, large rollers, sharp skiving
8-4	Violin Celeste	61 pipes	Same as Violin, sharp celeste from tenor-c
16-1⅗	Flute	97 pipes	Stopped wood C-f^0; open wood, inverted mouths; open Hoyt metal trebles
	Cathedral Chimes [8]	18 tubes	
	Xylophone [4]	37 bars	
	Glockenspiel [2]	30 bars	
	Chrysoglott [4]	49 bars	

SOLO

8	Trumpet	61 pipes	#2 Trumpet, "Style D"; Hoyt metal bells, reeds to #61
8-2	Tibia Clausa	85 pipes	Stopped wood, leathered lips, Hoyt metal trebles
8-4	Vox Humana	61 pipes	⅛-L, cylindrical, twist caps with vowel hole, long resonance boots, Hoyt metal; flue trebles

ACCOMPANIMENT

16 Contra Viol (t.c.)
16 Bourdon
16 Vox Humana (t.c.)
8 Trumpet
8 Diaphonic Diapason
8 Tibia Clausa
8 Clarinet
8 Violin
8 Violin Celeste
8 Concert Flute
8 Vox Humana
8 Octave
4 Piccolo
4 Viol
4 Octave Celeste
4 Flute
4 Vox Humana
2⅔ Twelfth [Flute]
2 Piccolo [Flute]
Chrysoglott
Snare Drum
Tambourine
Castanets
Chinese Block
Tom Tom
Sleigh Bell

SOLO

16 Diaphone
16 Tibia Clausa (t.c.)
16 Contra Viol (t.c.)
16 Bourdon
16 Vox Humana (t.c.)
8 Trumpet
8 Diaphonic Diapason
8 Tibia Clausa
8 Clarinet
8 Violin
8 Violin Celeste
8 Concert Flute
8 Vox Humana
4 Octave
4 Piccolo [Tibia]
4 Viol
4 Octave Celeste
4 Flute
2⅔ Twelfth [Tibia]
2⅔ Twelfth [Flute]
2 Piccolo [Tibia]
2 Piccolo [Flute]
1⅗ Tierce [Flute]
Cathedral Chimes
Xylophone
Glockenspiel
Chrysoglott

PEDAL

16 Diaphone
16 Bourdon
8 Trumpet
8 Diaphonic Diapason
8 Tibia Clausa
8 Cello
8 Flute
Bass Drum
Kettle Drum
Crash Cymbal
Cymbal
Toggle Switch: Traps 1st or 2nd touch

ACCOMP. 2ND TOUCH

8 Trumpet
8 Tibia Clausa
Cathedral Chimes
Triangle

SOLO 2ND TOUCH

16 Trumpet (t.c.)
8 Tibia Clausa
8 Clarinet

PISTONS

Bird
Steamboat Whistle
Klaxon
Siren
Horses Hoofs
Sleigh Bells
Doorbell
Projector Room Buzzer

TREMULANTS

Main
Solo
Vox

PISTONS

Five divisional pistons under each manual (setterboard)

GENERAL

Compass: 61 notes manuals, 32-note pedal, A.G.O. pedalboard
Wind pressure: 10″ (250 mm) main, Vox 6″ (150mm); sprung 3-valve reservoirs, beater tremulants
Blower: Spencer *Orgo-blo*
Expression: *Main, Solo*

GREEK HALL

ESSAY BY **SCOT HUNTINGTON**

THIS INSTRUMENT IS A STOCK MODEL 190, A LATE FACTORY revision of the Style E. The Style E was the third-most popular model of the company's bread and butter two-manual trade, (165 built), with the venerable D (the perfect distillation of resources to their lowest common denominator, 201 sold), itself second only to the little workhorse 4-rank Style B (225). The only difference between the D and larger E was the addition of the string undulant. The alphabet stock models were revised ca. 1926 as numbered units, the chief difference between the two styles being the extended unification of the *Tibia Clausa* to 2⅔ and 2, and the rarely-encountered addition of a *Machine Gun* effect to the toy counter. The letter and numbered stock models were produced concurrently, with the letters phasing out and numbered models taking precedence about 1928. The model 175 superseded the E, and the Greek Hall's model 190 was manifest as a 175 plus the addition of a *Clarinet*–there being no equivalent of this particular rank compliment in the alphabet series. Thus, the Model 190 (44 sold 1926-1931), falls musically between the older E and F. There were a number of late 3-manual versions, sixteen in all, generally with some small variant. The Appleton-Philadelphia organ was delivered in 1929 after the advent of talkies in 1928, and the end of the organ as movie accompaniment was nigh. Only four more of this model were produced after Opus 2070, the last delivered to Africa. There were only two minor stop additions found in Op. 2020 that weren't in earlier stock versions of the 190: Accom. *Bourdon* 16′ and Solo *Contra Viol (t.c.)* 16′. The lack of pedal couplers is typical.

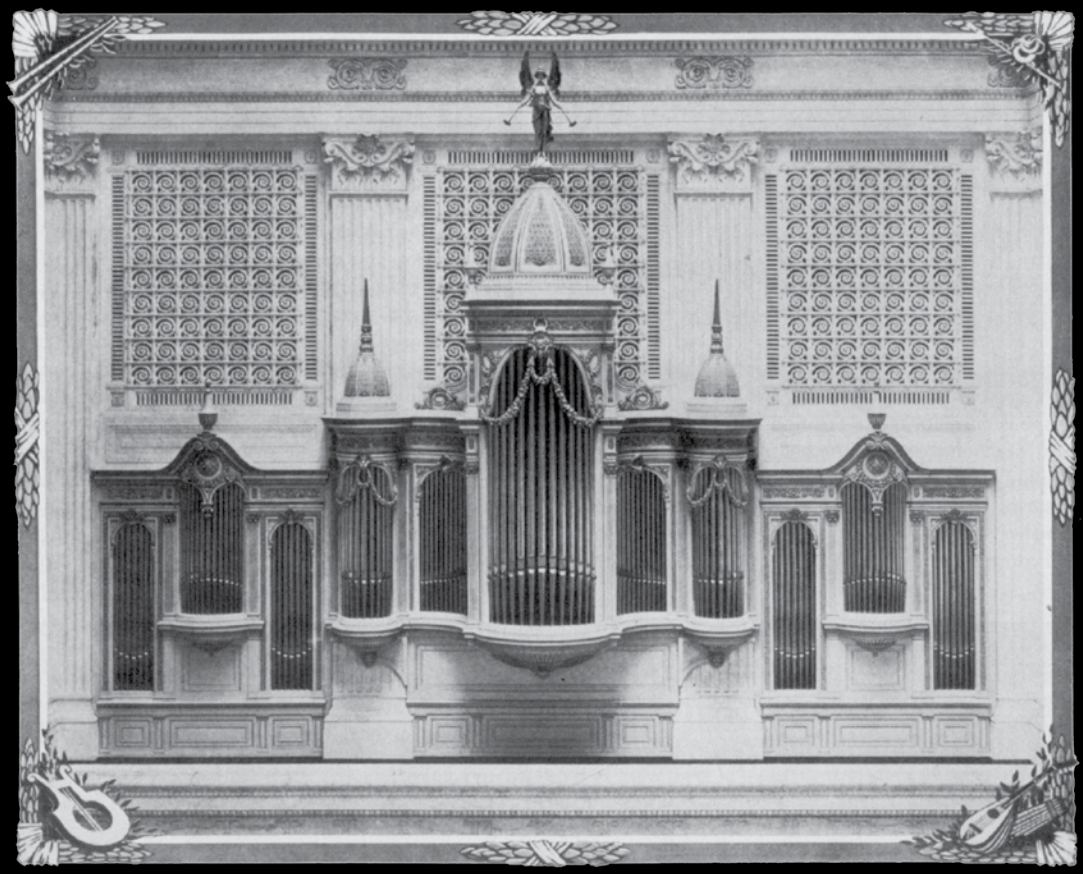
Wurlitzer was cavalier with its stop names in the small trade models, and the nomenclature did not connotate a specific construction as it might in a larger organ: the *Tuba Horn* and *Harmonic Tuba* were identical, as were the *Open Diapason–16′ Bass* and *Diaphonic Diapason–16′ Diaphone*, both representing a leathered Hoyt-metal rank with a 12-note metal diaphone as the 16-foot extension. In larger instruments, this same scale and treatment would represent the smaller diapason in large organs with both diaphonic and open diapasons, and the small metal diaphone bass could be found as an extension of either an open or horn diapason (itself the tonal equivalent of a "violin" diapason).

The legendary organist of the Paramount flagship in Manhattan, Jesse Crawford, is credited with influencing the development of the *Tibia Clausa* both found as multiple ranks in large organs on increasingly higher pressures, and unification extending up through the highest upperwork pitches, (the theatre equivalent of solo, first, and second diapasons in a church organ). Heretofore, Hope-Jones considered the tibia a foundation stop and it was so treated without much unification–a floor upon which the organ tone was built in a large acoustically-absorbent hall and with the curious ability to act as an amplifier when used with solo ranks without changing their color. Crawford, known not as a movie accompanist but as a ballad and jazz player popularized the use of the heavily tremulated tibia as upperwork. This trend, coupled with the pushing of the rank voicing to its orchestral limits (perhaps with higher pressures in the largest organs), characterized Wurlitzer tone in its third (mature) period of tonal development from the mid-20s onwards. If early accounts can be trusted, the earliest theatre tremulants were more orchestral in nature, being quite fast and shallow lending a shimmering quality to the organ tone–this can still be heard on certain organs in England reputed to be regulated according to original specifications. The deep throbbing tremulants were an evolution–the tibia being essentially a pure sine-wave gedeckt of enormous scale is unlovely heard on its own–but a tremulant of the proper slow speed and wide amplitude transforms the vowel and sonority of the stop into a virtual sob, with connoisseurs appreciating legendary examples like a classical builder appreciates famous diapasons.

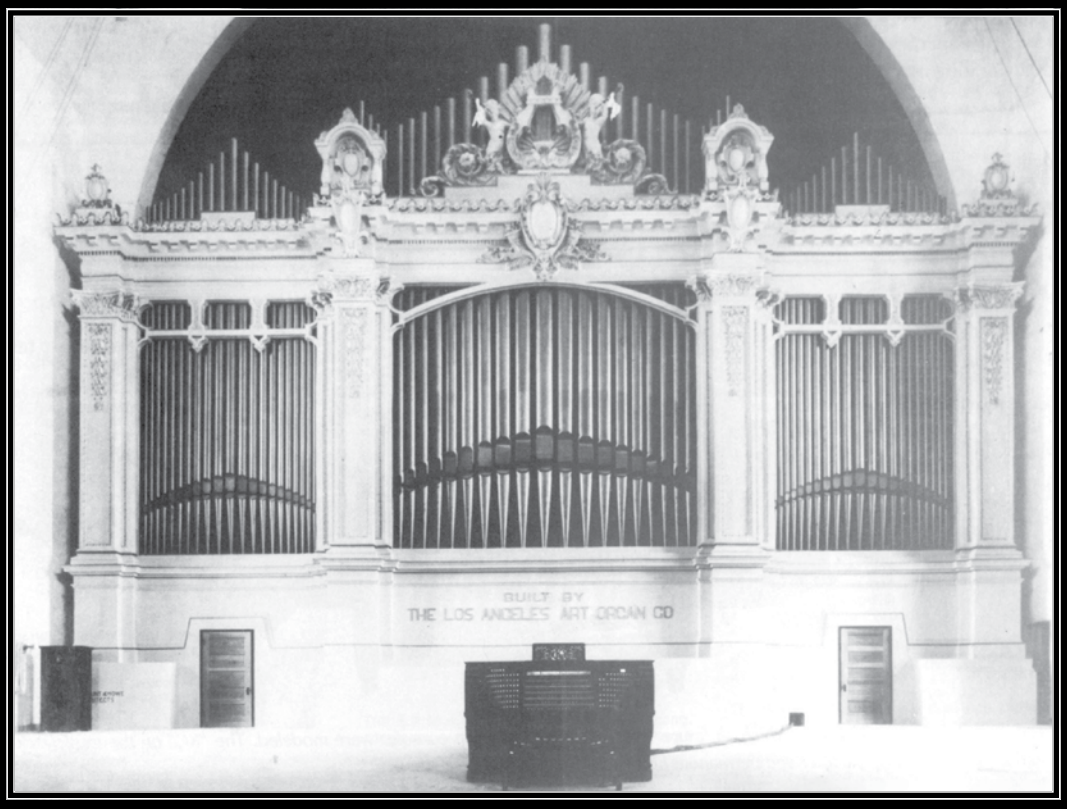
Opus 2020 was sold to a private collector, Lowell Ayers, who installed it in his home without change. He willed the instrument to the Smithsonian Institution upon his death where it remained in storage for some time. Never a museum friendly to its organ collection, the Smithsonian could never quite decide what to do with the organ, and when it was deaccessioned, it was acquired by the *Friends of the Wanamaker Organ* whereby it was sympathetically restored and installed (2013) in the Greek Hall without alteration–even to the point of obtaining a code variance so the original cloth-covered wiring could be reinstalled, and with its pneumatic console and relays pristinely intact. The work was skillfully executed under the direction of the Wanamaker organ curator Curt Mangel.

An unaltered theatre organ is one of the rarest of all organs still extant, especially the small workhorse models that labored in small houses outside the city center and in small shoebox theatres in the towns and small cities of rural America. Without the ubiquitous additions of postilions, Kinurae, extensive Tibia unification and a spurious collection of orphaned ranks, these unpretentious workhorse instruments are surprisingly versatile, and can be amazingly musical in their own right and taken on their terms.

SOURCES: Nick Myers, Nathan Bryson; *Wurlitzer Theatre Pipe Organ Fact Book,* Vestal Press; David Junchen (2005); *The Wurlitzer Pipe Organ, An Illustrated History*; Website by Peter Beames, South Adelaide, Australia: http://theatreorgans.com/au/opus

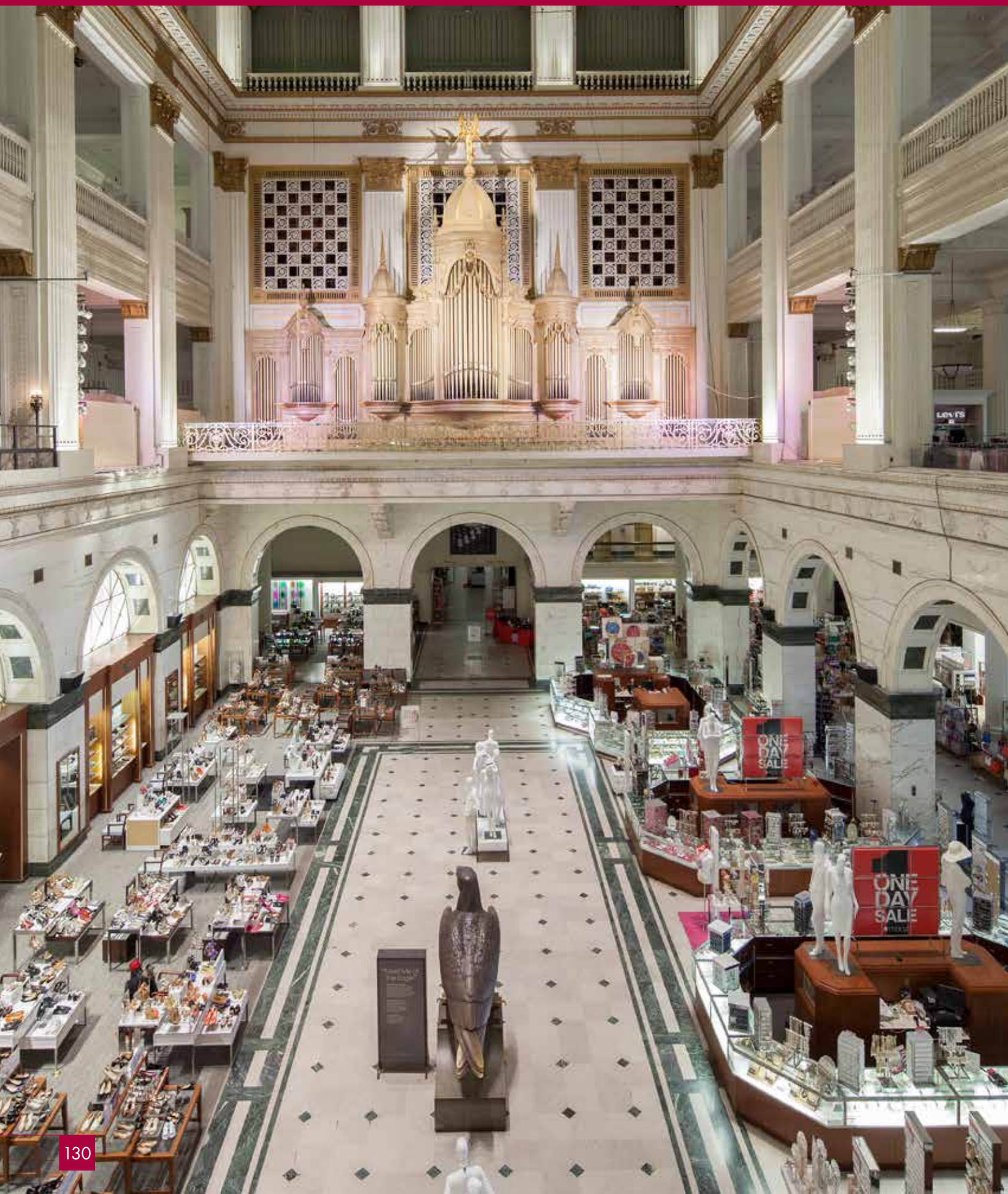


The newly installed organ in 1911 and before the balcony railing was installed. Note the play of light and shadow on the case from the massive skylight which once bathed the Grand Court in natural light.



The Louisiana Purchase Exposition, Festival Hall and the "Largest Organ in the World", with the console in concert position, 1904. Portions of this case exist behind the present store facade.

MACY'S DEPARTMENT STORE



MACY'S DEPARTMENT STORE

FORMER WANAMAKER'S DEPARTMENT STORE

Philadelphia, Pennsylvania

Los Angeles Art Organ Co. 1904, George Ashdown Audsley, Designer
William Boone Fleming 1911, 1924, et.al.

SOURCES: Nick Myers, with appreciation; Nathan Bryson; Ray Biswanger, *Music in the Marketplace,* Friends of the Wanamaker Organ, (1999) 247-249; O.H.S. convention handbook documentation; private correspondence with Ray Biswanger, May 2022.

Main Pedal Organ	**Pipes**	**Mat.**
5″-25″, 50 ranks; *italics* are parent rank of unit stop	1665	
64 Gravissima (independent 21⅓)	25	w
32 *Contra Diaphone*	32	w
16 Diaphone	12	w
8 Stentor	12	m
32 First Contra Open Diapason (wood)	32	w
32 Second Contra Open Diapason (from *Great*)	32	
32 Contra Bourdon	32	w
16 First Open Diapason	32	w
16 Second Open Diapason (metal)	32	m
16 Third Open Diapason (wood)	32	w
16 *Open Flute*	32	w
8 Second Tibia	12	w
4 Second Tibia	12	w
16 Bourdon	32	w
16 Soft Bourdon (from *Swell*)		
16 Violone	32	w
16 Gamba	32	m
16 Dulciana (from *Choir*)		
10⅔ Open Quint	32	w
10⅔ Stopped Quint	32	w
8 Open Diapason	32	w
8 Octave	32	m
8 First Tibia	32	w
8 Octave Soft Bourdon	32	w
8 First Cello	32	m
8 Second Cello	32	m
8 Soft Dulciana	32	m
8 Soft Flute	32	w
4 Octave	32	m
4 Principal	32	m
4 First Tibia	32	w
4 Soft Flute	32	w
X Grand Mutation 32 (16, 10⅔, 8, 6⅔, 5⅓, 4, 3⅕, 2⅔, 2, 1⅗)	320	m
VIII Mixture 32 (from *Great*) (16, 10⅔, 8, 6⅔, 5⅓, 4, 3⅕, 2⅔)		
VI Mixture 16 (from *Great*) (Same as VIII mixture but omits ranks 1 & 2)		
VII Mixture (metal) (6⅔, 5⅓, 4, 3⅕, 2⅔, 2, 1⅗)	224	m
32 *Contra Bombarde* (23″ pressure)	32	w
16 Bombarde	12	w/m
8 Bombarde	12	m
16 Trombone	32	m
16 Tuba	32	m
16 Bassoon (from *Orchestral*)		
16 English Horn (from *Orchestral*)		
16 Bass Clarinet (from *Orchestral*)		
16 Bass Saxophone (from *Orchestral*)		
16 Euphonium (free reed)	32	m
16 Contra Fagotto	32	m
8 Octave Fagotto	32	m
8 Tromba	32	m
4 Clarion	32	m

Ethereal Pedal Organ		
25″, 4 ranks	128	
32 Acoustic Bass (plays 16 Diap. + independent 10⅔)	32	w
16 Diapason	32	w
16 Bombarde	32	w
8 Bombarde	32	w

Echo Pedal Organ			
5″, 2 ranks		64	
16 Open Diapason	16	32	w
16 Stopped Diapason	16	32	w

String Pedal Organ		
15-27″, 17 ranks; *italics* are unit stop parent ranks	652	
32 *Contra Diaphone* (27″)	32	w
16 Diaphone	12	w
16 Diaphone	12	w
32 *Contra Gamba*	32	m
16 Gamba	12	m
8 Gamba	12	m
16 *First Violone*	32	w
8 First Violone	12	w
16 *Second Violone*	32	m
8 Second Violone	12	m
4 Violone	12	m
16 *Viol*	32	m
8 Viol	12	m
16 *Viol* (slighty ♯)	32	m
8 Viol (slighty ♯)	12	m
XII *Mixture XII* (*32′ String Diaphone + ranks below, separately drawable*)		
16 Mutation Diaphone	32	m
16 Mutation Viol	32	m
10⅔ Mutation Viol	32	m
8 Mutation Viol	32	m
5⅓ Mutation Viol	32	m
4 Mutation Viol	32	m
2⅔ Mutation Viol	32	m
2 Mutation Viol	32	m

MACY'S DEPARTMENT STORE

1⅗	Mutation Viol	32	m
1⅓	Mutation Viol	32	m
1	Mutation Viol	32	m

Vox Chorus Pedal Organ

15″, 2 ranks		64	
16	First Vox Humana	32	m
16	Second Vox Humana	32	m

Pedal to Pedal 8′
Pedal Unison Off

Choir Organ (I)

5″, 24 ranks		1452	
16	Double Dulciana	61	m
8	Open Diapason (leathered lips)	61	m
8	Violin Diapason	61	m
8	Stopped Diapason	61	w
8	Concert Flute	61	m
8	Quintadena	61	w
8	Dulciana	61	m
8	Salicional	61	m
8	Vox Angelica	61	m
8	Vox Celeste (♯)	49	m
8	Keraulophon	61	m
4	Forrest Flute	61	w
4	Salicet	61	m
2	Piccolo	61	m
VI	Soft Cornet (2⅔, 2, 1⅗, 1⅓, 1, ⅘)	366	m
16	Saxophone	61	m
8	Saxophone	61	m
8	English Horn (free reed)	61	m
8	Clarinet	61	m

Choir to Choir 16′, 4′
Choir Unison Off

Unenclosed Great Organ (II)

5-11″, 28 ranks		1696	
32	Sub Principal	61	m
16	Double Diapason	61	m
16	Contra Gamba	61	m
10⅔	Sub Quint	61	w
8	Diapason Phonon (leathered lips)	61	m
8	Diapason Major	61	m
8	First Diapason	61	m
8	Second Diapason	61	m
8	Third Diapason	61	m
8	Fourth Diapason)	61	w
8	Gamba II	122	m
8	Major Tibia	61	w
8	Mezzo Tibia	61	w
8	Minor Tibia	61	w
8	Double Flute	61	w
8	Nasard Flute II	122	m
4	Octave	61	m
VIII	Mutation (16, 10⅔, 8, 6⅔, 5⅓, 4, 3⅕, 2⅔)	488	m
8	Harmonic Trumpet	61	m

Enclosed Great (II)

5″, 19 ranks, located in Choir box		1159	
8	Covered Tibia (wood)	61	w
8	Harmonic Flute	61	m
5⅓	Quint	61	m
4	Principal	61	m
4	Harmonic Flute	61	m
3⅕	Tierce	61	m
2⅔	Octave Quint	61	m
2	Super Octave	61	m
VII	Mixture (2⅔, 2, 1⅗, 1⅓, 1, ⅔, ½)	427	m
16	Double Trumpet	61	m
8	Tuba	61	m
8	Trumpet	61	m
4	Harmonic Clarion	61	m

Great to Great 16′, 4′
Great Unison Off

Great Chorus (II)

14″-16″, 11 ranks		779	
8	Chorus Diapason Magna (double languid)	61	m
8	Chorus Stentorphone	73	w/m
8	Chorus First Diapason	73	w/m
8	Chorus Second Diapason	73	w/m
8	Chorus Third Diapason	73	m
8	Chorus Major Flute	73	w
8	Chorus Double Flute	73	w
8	Chorus Gamba	73	m
4	Chorus Octave	73	m
4	Chorus Flute	73	w
2⅔	Chorus Nasard	61	m

Swell Organ (III)

5-22″, 53 ranks		3312	
16	Double Diapason	61	m
16	Soft Bourdon	61	w
8	Stentorphone	61	m
8	Horn Diapason	61	w/m
8	Violin Diapason	61	m
8	Bell Flute	61	m
8	Orchestral Flute	61	w
8	Harmonic Flute	61	m
8	Grand Flute II	122	w
8	Double Flute	61	w
8	Tibia Dura	61	w
8	Clarabella	61	w
8	Melodia	61	w
8	Gamba Celeste II (♯)	122	m
8	Gamba	61	m

8	Soft Dulciana	61	m
5⅓	Quint Bourdon	61	w
4	First Octave	61	m
4	Second Octave	61	m
4	Harmonic Flute II *(tuned in unison)*	122	m
2⅔	Nazard	*Prepared*	
2	Harmonic Piccolo	61	m
V	Mixture (2, 1⅓, 1, ⅔, ½)	365	m
VI	Mixture (orig. *Full Mixture*; 2⅔, 2, 1⅗, 1⅓, 1, ⅔)	366	m
16	Bass Tuba (22″)	61	m
16	Bass Trombone (22″)	61	m
16	Contra Fagotto	61	m
16	Double Oboe Horn	61	m
8	Tuba (22″)	61	m
8	Trombone (22″)	61	m
8	Fagotto	61	m
8	Oboe	61	m
8	Trumpet	61	m
8	Bassett Horn	61	m
8	Clarinet II *(tuned in unison)*	122	m
8	Clarinet	61	m
8	Vox Humana II *(tuned in unison)*	122	m
4	Harmonic Clarion	61	m
4	Musette	80	m

Original String (III)

5″, 18 ranks, plays from Swell (or Sw.) keybd., orig. Audsley design — 1098

16	Contra Bass	61	w/m
8	Violoncello	61	m
8	Viol	61	m
8	Viol (slighty ♯)	61	m
8	Viola	61	m
5⅓	Quint Viol	61	m
4	Octave Viol	61	m
4	Violina	61	m
3⅕	Tierce (harmonic)	61	m
V	Corroborating Mixture V (string tone; 2, 1⅗, 1⅓, 1, ⅔)	305	m
IV	Viol Cornet (2⅔, 2, 1⅗, 1)	244	m

Swell to Swell 16′, 4′
Swell Unison Off

Solo Organ (IV)

15″, 51 ranks — 3713

16	Double Open Diapason	73	m
16	Grand Viol	73	m
8	First Diapason	73	w/m
8	Second Diapason	73	w/m
8	Third Diapason	73	w/m
8	Violin Diapason	73	m
8	Harmonic Flute	73	m
8	Tierce Flute (II)	146	m
8	Chimney Flute	73	m
8	Harmonic Flute	73	m
8	Clarabella	73	w
8	Gemshorn	73	m
8	Viol	73	m
8	Viol Celeste (slighty ♯)	73	m
8	Nasard Gamba II [Gamba+Nasard]	146	m
8	Grand Gamba	73	m
8	Grand Gamba Celeste (♯)	73	m
8	Quintaphon	73	m
5⅓	Quint Diapason	73	m
4	Octave	73	m
3⅕	Harmonic [Tierce]	73	m
2⅔	Harmonic [Twelfth]	73	m
2	Harmonic Piccolo	73	m
VI	Grand Mixture (5⅓, 4, 2⅔, 2, 1⅓, 1)	438	m
VI	Mixture (2⅔, 2, 1⅓, 1, ⅘, ⅔)	438	m
V	Mixture (4, 2⅔, 2, 1⅗, 1⅓)	365	m
16	Double Trumpet	73	m
16	Tuba	73	m
8	Trumpet	73	m
8	Soft Tuba	73	m
8	Cornopean	73	m
8	Ophicleide	73	m
8	Musette	73	m
4	Ophicleide	73	m
4	Tuba	73	m

Solo to Solo 16′, 4′
Solo Unison Off

Ethereal Organ (V)

25″, 23 ranks — 1670

16	Bourdon	73	w
8	First Open Diapason	73	m
8	Second Open Diapason	73	m
8	Clear Flute	73	w
8	Harmonic Flute	73	m
8	Double Flute	73	w
8	Grand Gamba	73	m
8	Gamba Celeste (slighty ♯)	63	m
5⅓	Quint Flute	73	w
4	Octave	73	m
4	Harmonic Flute	73	m
2⅔	Harmonic [Twelfth]	73	m
2	Harmonic Piccolo	73	m
IV	Mixture (5⅓, 4, 2⅔, 2)	292	m
16	Tuba Profunda	73	m
8	Tuba Magna (Stentor)		
8	Tuba Mirabilis	73	m
8	French Trumpet	73	m
8	Grand Clarinet	73	m
8	Post Horn [20″ was later reduced to 15″]	73	m
4	Tuba Clarion	73	m

Ethereal to Ethereal 16′, 4′
Ethereal Unison Off

MACY'S DEPARTMENT STORE

Orchestral

15″ flues, 15″ reeds, 32 ranks, floating — 2312

16	Contra Quintadena	73	w/m
8	Duophone (wood)	73	w
8	Tibia	73	w
8	Covered Tibia	73	w
8	Concert Flute	73	w
8	Harmonic Flute	73	m
8	Mellow Flute	73	w
8	String Flute	73	w
8	Double Flute	73	w
8	Hollow Flute	73	w
4	Octave	73	m
4	Harmonic Flute	73	m
4	Orchestral Flute	61	m
4	Covered Flute	73	w/m
2	Harmonic Piccolo	61	m
16	Bassoon	73	m
16	English Horn	73	m
16	Bass Clarinet	73	m
16	Bass Saxophone	73	m
8	Orchestral Trumpet	73	m
8	Oboe	73	m
8	Bassett Horn	73	m
8	Bassoon	73	m
8	Orchestral Clarinet	73	m
8	French Horn I [open]	73	m
8	French Horn II [bell-shaped]	73	m
8	French Horn III [capped]	73	m
8	Muted Cornet	73	m
8	Saxophone	73	m
8	Orchestral Oboe	73	m
8	English Horn	73	m
8	Kinura	73	m
	Orchestral to Orchestral 16′, 4′		
	Orchestral Unison Off		

Vox Humana Chorus

15″, 8 ranks, floating — 572

16	Vox Humana	73	m
8	First Vox Humana	73	m
8	Second Vox Humana	73	m
8	Third Vox Humana	73	m
8	Fourth Vox Humana	73	m
8	Fifth Vox Humana	73	m
8	Sixth Vox Humana	73	m
8	Seventh Vox Humana	61	m

String Organ

15″, 88 ranks, floating — 6340

16	Violone	73	m
16	First Contra Gamba	73	m
16	Second Contra Gamba	73	m
16	First Contra Viol	73	m
16	Second Contra Viol	73	m
16	First Viol	73	m
16	Second Viol	73	m
8	Violin Diapason	73	m
8	Gamba	73	m
8	Nasard Gamba II [Gamba+Nazard]	146	m
8	Nasard Gamba II (celeste ♯)	146	m
8	First Cello	73	m
8	First Cello (♯)	73	m
8	First Cello (♭)	73	m
8	Second Cello	73	m
8	Second Cello (♯)	73	m
8	Second Cello (♭)	73	m
8	First Orchestral Violin	73	m
8	First Orchestral Violin (♯)	73	m
8	First Orchestral Violin (♭)	73	m
8	Second Orchestral Violin	73	m
8	Second Orchestral Violin (♯)	73	m
8	Second Orchestral Violin (♭)	73	m
8	Third Orchestral Violin	73	m
8	Third Orchestral Violin (♯)	73	m
8	Third Orchestral Violin (♭)	73	m
8	Fourth Orchestral Violin	73	m
8	Fourth Orchestral Violin (♯)	73	m
8	Fourth Orchestral Violin (♭)	73	m
8	Fifth Orchestral Violin	73	m
8	Fifth Orchestral Violin (♯)	73	m
8	Fifth Orchestral Violin (♭)	73	m
8	Sixth Orchestral Violin	73	m
8	Sixth Orchestral Violin (♯)	73	m
8	Sixth Orchestral Violin (♭)	73	m
8	First Muted Violin	73	m
8	First Muted Violin (♯)	73	m
8	First Muted Violin (♭)	73	m
8	Second Muted Violin	73	m
8	Second Muted Violin (♯)	73	m
8	Second Muted Violin (♭)	73	m
8	Third Muted Violin	73	m
8	Third Muted Violin (♯)	73	m
8	Third Muted Violin (♭)	73	m
8	Fourth Muted Violin	73	m
8	Fourth Muted Violin (♯)	73	m
8	Fourth Muted Violin (♭)	73	m
8	Fifth Muted Violin	73	m
8	Fifth Muted Violin (♯)	73	m
8	Fifth Muted Violin (♭)	73	m
8	Sixth Muted Violin	73	m
8	Sixth Muted Violin (♯)	73	m
8	Sixth Muted Violin (♭)	73	m
5⅓	Quint Violina	73	m
5⅓	Quint Violina (♯)	73	m
4	First Orchestral Violina	73	m
4	First Orchestral Violina (♯)	73	m
4	Second Orchestral Violina	73	m

4	Second Orchestral Violina (♯)	73	m
3⅕	Tierce Violina	73	m
3⅕	Tierce Violina (♯)	73	m
2⅔	Nasard Violina	73	m
2⅔	Nasard Violina (♯)	73	m
2	Super Violina	61	m
2	Super Violina (♯)	61	m
8	First Dulciana	73	m
8	First Dulciana (♯)	73	m
8	Second Dulciana	73	m
8	Second Dulciana (♯)	73	m
8	Third Dulciana	73	m
8	Third Dulciana (♯)	73	m
8	Fourth Dulciana	73	m
8	Fourth Dulciana (♯)	73	m
8	Fifth Dulciana	73	m
8	Fifth Dulciana (♯)	73	m
8	Sixth Dulciana	73	m
8	Sixth Dulciana (♯)	73	m
4	First Octave Dulciana	73	m
4	First Octave Dulciana (♯)	73	m
4	Second Octave Dulciana	73	m
4	Second Octave Dulciana (♯)	73	m
V	Dulciana Mixture (each rank selectable; 2⅔, 2, 1⅗, 1, ⅔)	305	m
	String to String 16′, 4′		
	String Unison Off		

Echo

5″, 33 ranks, floating		2013	
16	Bourdon	61	w
8	Open Diapason	61	m
8	Violin Diapason	61	m
8	Stopped Diapason	61	w
8	Night Horn	61	m
8	Clarabella	61	w
8	Melodia	61	w
8	Orchestra Viol	61	m
8	Soft Viol	61	m
8	Soft Viol Celeste (slighty ♯)	61	m
8	Unda Maris II (♯)	110	w
5⅓	Open Quint	61	m
4	Octave	61	m
4	Harmonic Flute	61	m
4	Mellow Flute	61	w/m
VI	Mixture (5⅓, 4, 2⅔, 2, 1⅗, 1⅓)	366	m
V	Cornet Mixture (2⅔, 2, 1⅗, 1⅓, 1)	305	m
16	Double Trumpet	61	m
8	Trumpet	61	m
8	Capped Oboe	61	m
8	Euphone (metal, free reed)	73	m
8	Vox Humana II	122	m
	Echo to Echo 16′, 4′		
	Echo Unison Off		

Stentor Organ (VI) (console preparation only)

(15″-100″), currently all ancillary divisions can be played from this manual, and several independent ranks having their own wind chests can be assigned to this manual as well, such as the Diapason Magna, Clear Flute, String Organ Celli and Nasard Gambas, etc. The Tuba is repurposed from Grace Church, New York City and reworked by Sam Hughes, for the organ's 100th anniversary, thus its naming as the "Centennial Tuba"

16	Tuba Magna [t.c.]	extension	
8	Tuba Magna [unenclosed, 25″]	61	m
	Stentor to Stentor 16′, 4′		
	Stentor Unison Off		

Grand Total Pipe count **28,750**

Percussion Organ

Floating, each stop may be coupled to any manual without affecting the other stops in the division.

Major Chimes	37 tubes	C-c¹
Minor Chimes [2015, A435 Aeolian]	25 tubes	g^0-g^2
Celesta *(by Mustel of Paris)*	49 bars	c^0-c^2
Tuned Gongs	49 bars	c^0-c^2
[graduated diameter, canteen-shape brass resonators]		
Metalophone	49 bars	c^0-c^2
Piano I (*preparation*)	[88 notes]	[grand]
Piano II	88 notes	upright
Harp I	49 bars	c^0-c^2
Harp II (*preparation*)		
Cymbalstar *(in memory of Virgil Fox)*		
Cymbal Roll *(Crescendo rolling cymbal)*		
Chinese Gong *(Tam tam, 84″ diameter)*	1	toe stud
Echo Chime	1	Ch. piston
Blank Tablet		

MECHANICALS

Including modifications made during the 1990s console rebuilding and control system conversion.

Control System: *Opus-Two,* custom design

Stop key color coding: Pedal-Black; Choir-Pale Green; Great-White; Swell-Pale Blue; Solo-Purple; Ethereal-Brown; Stentor-Red; Echo-Yellow; Orchestral-Royal Blue; String-Gray; Percussion-Orange Yellow Reed stops have red bands

TREMOLOS

Great I, II, Tibia; Chorus; Swell I, II, Choir I, II, Solo I, II, Ethereal I, II, Orchestral I, II, String I, II, Echo I, II, Pedal I

MACY'S DEPARTMENT STORE

COUPLERS

To Pedal 8′, 4′: Great, Swell, Choir, Solo, Orchestral, Ethereal, String, Stentor, Echo
To Pedal 8′: Chorus

Swell to Great 16′, 8′, 4′
Choir to Great 16′, 8′, 4′
Solo to Great 16′, 8′, 4′
Ethereal to Great 16′, 8′, 4′
Stentor to Great 16′, 8′, 4′

Solo to Swell 16′, 8′, 4′
Ethereal to Swell 16′, 8′, 4′
Stentor to Swell 16′, 8′, 4′

Great to Choir 16′, 8′, 4′
Swell to Choir 16′, 8′, 4′
Solo to Choir 16′, 8′, 4′
Ethereal to Choir 16′, 8′, 4′
Stentor to Choir 16′, 8′, 4′

Ethereal to Solo 16′, 8′, 4′
Stentor to Solo 16′, 8′, 4′

Solo to Ethereal 8′
Stentor to Ethereal 16′, 8′, 4′

Transfers:
Chorus on: Great, Swell, Choir, Solo, Ethereal, Stentor
Orchestral on: Great, Swell, Choir, Solo, Ethereal, Stentor
Orchestral Flues on: Great, Choir
String on: Great, Swell, Choir, Solo, Ethereal, Stentor
Echo on: Great, Swell, Choir, Solo, Ethereal, Stentor

PISTONS AND ACCESSORIES

Devices under Stentor Manual:
String to Pedal 8′, String to Pedal 4′
String combinations 1-12
Echo combinations 1-5
Stentor combinations 1-8
Stentor to Pedal 8′, Stentor to Pedal 4′, Stentor Expression Slider

Devices under Ethereal Manual:
Ethereal to Pedal 8′, Ethereal to Pedal 4′
Ethereal combinations 1-7
Orchestral combinations 1-2
General combinations 1-7
Orchestral combinations 3-10
Orchestral to Pedal 8′, Orchestral to Pedal 4′, Ethereal Expression Slider

Devices under Solo Manual:
Solo to Pedal 8′, Solo to Pedal 4′
Solo combinations 1-7
General combinations 8-18
Solo combinations 8-13
Echo to Pedal 8′, Echo to Pedal 4′, Solo Expression Slider

Devices under Swell Manual:
Swell to Pedal 8′, Swell to Pedal 4′
Swell combinations 1-7
General combinations 19-29
Swell combinations 8-13
Chorus to Pedal 8′, Pedal to Pedal 8′, Swell Expression Slider

Devices under Great Manual:
Great to Pedal 8′, Great to Pedal 4′
Great combinations 1-7
General combinations 30-40
Great combinations 8-13
Ethereal off Crescendo, Stentor off Crescendo

Devices under Choir Manual:
Echo Chime, Metalophone to Great
Pedal combinations 1-14
Choir combinations 1-10
Choir to Pedal 8′, Choir to Pedal 4′, Choir Expression Slider

Major Chimes on: Great, Swell, Choir, Solo, Ethereal, Stentor
Major Chimes 4′, Unison Off
Major Chimes Sustain
Minor Chimes on: Great, Swell, Choir, Solo, Ethereal, Stentor,
Major Chimes on Pedal
Minor Chimes on Pedal
Gongs on: Great, Swell, Choir, Solo, Ethereal, Stentor
Metalophone on: Great, Swell, Choir, Solo, Ethereal, Stentor
I Harp 4′, Unison Off, Sustain
I Harp on Stentor, Ethereal, "Solo, Swell, Great, Choir
II Harp 4, Unison Off, Sustain
II Harp on Stentor, Ethereal, Solo, Great, Choir
I Piano 16′, 4′, Unison Off, Sustain
I Piano on Stentor, Ethereal, Solo, Swell, Great, Choir
II Piano 16, 4′, Unison Off, Sustain
II Piano on Stentor, Ethereal, Solo, Great, Choir, Pedal
Celesta 4′, Unison Off,
Celesta on: Stentor, Ethereal, Solo, Swell, Great, Choir

EXPRESSION CONTROLS

String Expression to: Stentor, Ethereal, Solo, Swell, Great, Choir
Orchestral Expression to: Stentor, Ethereal, Solo, Swell, Great, Choir
Echo Expression to: Stentor, Ethereal, Solo, Swell, Great, Choir
Stentor Expression to: Ethereal, Solo, Swell, Great, Choir
Ethereal Expression to: Solo, Swell, Great, Choir
Solo Expression to: Swell, Great, Choir
Swell Expression to Great, Choir
Great Expression to Choir
Choir to Great Expression

REVERSIBLES

Orchestral Violins Silent
Celestes Off
Cellos Silent
Cellos to Cellos 16′
Cellos on Great, Cellos on Choir
Pedal Mixtures Silent; Manual Mixtures Silent; Stentor Pedal Reeds Silent; Ethereal Pedal Reeds Silent; Main Pedal Reeds Silent
8′-4′ Stentor Reeds Silent; Ethereal Reeds Silent; Solo Reeds Silent
High Pressure Reeds Silent
Great Reeds Silent
Choir Reeds Silent

Tutti: FFF, FF, F
Combination Action Adjuster
Tremolos on Crescendo
Expression Couplers on Manual Sliders
General Release (cancels all stops)

TABLETS ABOVE THE MANUAL KEYBOARDS

Crescendo off: Great Manual, Choir Manual Crescendo
Great Expression Master
Percussion to Great Expression
Pedal to Great
Inter-Manual Couplers Neutral
Auto-Manual Couplers Neutral
Expression Couplers Neutral
Couplers Silent 16′
Stops Silent 16′
Couplers Silent 4′
Pedal Couplers Silent 4′
Choir/String Pistons Transfer
Pedal Divider
Pedal Eliminator I, II, III
Pedal off Crescendo: I, II, III
Crescendo Off: Great, Swell Choir, Solo, String, Orchestral, Ethereal, Stentor, Echo

EXPRESSION SHOES

(The right column shows the reversible toe stud directly above each shoe)
Left to right:

Percussion	Crescendo off Choir
Echo	Crescendo off Great
String	String off Crescendo
Orchestral	Open Diapason I 32′
Choir	Open Diapason II 32′
CRESCENDO	Tutti FFF
Great	Gt. Exp. Master
Swell	Str. Celestes off
Solo	Pedal Eliminator I
Ethereal	Pedal Eliminator II
Stentor	Pedal Eliminator III

LEFT TOE STUD JAMB

Top Row (left to right)
Pedal combination 15
Pedal combination 16
Master (general) combination 41
Master combination 42
Master combination 43
Second Row
Tutti F
Bombarde 32′
Diaphone 32′
Gamba 32′
Bourdon 32′

RIGHT TOE STUD JAMB

Top Row (left to right)
Master combination 44
Master combination 45
Master combination 46
Pedal combination 17
Pedal combination 18
Second Row
16′ Couplers Silent
16′ Stops Silent
4′ Couplers Silent
4′ Pedal Couplers Silent Tutti FF

Push-button switches on panels to the left and right of the music rack enable whole divisions of the organ to be shut off without affecting remaining divisions. This permits recitals to proceed in the event of ciphers or other problems which would necessitate the shutting down that part of the instrument. Also found with these switch panels are slides that control the beat speed for each of the two Tremolos available for each division. The swell-shade and Crescendo indicator panel is located above the music rack.

At the top left of the left jamb are indicator lights showing which blowers are in operation, as well as the status of the vacuum-action supply that powers the pneumatic console and certain Percussion stops.

MISCELLANEOUS

Pitch: A435@70°

BLOWERS

Suction	3 hp
High	60
Low	20
Chorus	20
Ethereal	25
String	30
Orchestral	10
Echo	5
Total horsepower	**173**

THE STENTOR DIVISION PROPOSALS

This contains transcripts of historic documents.

ESSAY I BY SCOT HUNTINGTON

THE STENTOR DIVISION WAS TO BE THE FINAL CAPSTONE OF this grand organ, already enlarged twice in an effort to make it louder and grander. It would seem the purpose of this division was to top the Philadelphia Orchestra playing fortissimo, and not intended for daily use during regular store hours, when the organ was seldom played above a *mezzo-forte* for the end of the organist's set. Henry Willis III was fresh off his great success in the cavernous Liverpool Cathedral and his successful experiments there with double-languid diapasons and super-high pressures. His scheme is the most daring, and perhaps the most audacious of the three, but is still rationally conceived along the lines of traditional ensemble construction. His concept of a "Synthesis Department" for the creation of new tones through the combining of harmonic pitches would seem to predate even Senator Richards' thinking about harmonic structure. Willis was not aware that Rodman Wanamaker was particularly keen that his organ should be an American enterprise in both thought and execution. Willis of course, would have relished the opportunity to show his American rivals how an organ really ought to be built. However, when asked if he would contribute parts to an American-built plan instead of building his own concept, he bristled and withdrew from the project.

The Courboin scheme seems somewhat impractical in its scope, like a *piñanta* of the loudest ranks people knew how to make, but without any cohesive form to their purpose. The Harrison scheme is the most restrained, and the most classically-oriented ensemble structure of the group. A common factor in all three schemes was a full-compass 64′ stop in the Pedal, and the presence of extraordinarily high-pressure reeds.

The Courboin scheme predates the actual application of 100″ pressure for reeds in the large Atlantic City organ, and the eventual realization through those experiments that little of practicality was gained once one exceeded 50″ pressure in terms of power and tone, but still requiring special engineering for the blowers, chests, and windsystems to accommodate such high pressure. Courboin and Till may have begun to backtrack on the practicality of their design when the newly-arrived Willis disciple G. Donald Harrison is approached for a smaller but nevertheless powerful scheme. The Welte company was the store's chief supplier of pipework during this period, and was entering a period of instability when Harrison joined forces with Ernest Skinner. It is highly likely that his English/Willis pedigree was just the authenticity they were seeking for this *coup de grace* division and at just the moment they were casting about for another supplier of quality, and which was also solvent. Given the chronology of the three plans, and Wanamaker's insistence that the organ be an American creation, it is most likely the Harrison scheme was the one sitting on Wanamaker's desk with the pen hovering over the contract, when he died suddenly on March 9, 1928. After Rodman's death, the grand organ work came to a halt, Courboin's wings were clipped as the managing voice of both the organ shop and the organ's enlargement program, and only the smaller projects already underway were completed after the store officials decided the organ was as vast as it needed to be. The Great *Chorus* division was completed and became the ersatz realization of the Stentor division's planned "super chorus". The recent addition of the Skinner Organ Co. *Tuba* from Grace Church, New York City was completed in time for the organ's 100th anniversary, occasioning its christening as the "Centennial Tuba". It was assigned to the Stentor manual in a realization of that division's intended function.

PROPOSAL I

Henry Willis III, August 1925, London
"To be placed opposite the main organ."

Manual Bombarde Department

Enclosed Section

32′	Contra Fagotto	12″
16′	Bombarde	50″
8′	Ophicleide	50″
8′	Trompette Harmonique	50″
4′	Clarion	50″
VI	Sesquialtera (2, 1⅗, 1⅓, 1, ⅘, ½)	12″
8′	Silver Trumpet	50″
V	Grand Cornet (8, 4, 2⅘, 2, 1⅗)	12″
VI	Cymbale (1, ⅘, ½, ⅖, ⅓, ¼)	12″

Unenclosed

16′	*Contra Tuba* [unit]	50″
8′	Tuba	
4′	Clarion	
XII	Grand Chorus (16, 8, 5⅓, 4, 2⅔, 2, 1⅓, 1, ⅔, ½, ⅓, ¼)	12″
8′	*Tuba Mirabilis* [unit]	75″
4′	Clarion	

Pedal Bombarde

Enclosed

32′	Contra Trombone [unit]	50″
16′	Trombone	
8′	Clarion	
VI	Sesquialtera (8, 5⅓, 4, 3⅕, 2⅔, 2)	12″

Unenclosed

64′	*Bombarde* [unit]	50″
32′	Bombarde	
16′	Bombarde	
8′	Bombarde	
IX	Fourniture (16, 10⅔, 8, 5⅓, 4, 2⅔, 2, 1⅓, 1)	12″

Synthesis Department
Each box capable of control by finger switches having 8 positions, or coupled to one expression pedal

Box I Unison Ranks

32′	Sub Bourdon
16′	Bourdon
8′	Open Flute
8′	Rohr Flute
8′	Cor de Nuit
4′	Flauto Traverso
4′	Lieblich Flute
2′	Flautino
2′	Lieblich Piccolo
1′	Octave Piccolo
V	Repeating Mixture (4, 2, 1, ½, ¼)
16′	Double Horn
8′	Horn
4′	Octave Horn

Box II Quint Ranks

21⅓	Sub Quint
10⅔	Quint
5⅓	Quint
2⅔	Twelfth
2⅔	Nasard
1⅓	Larigot
V	Repeating Mixture (5⅓, 2⅔, 1⅓, ⅔, ⅓)
10⅔	Quint Horn
5⅓	Quint Horn
2⅔	Quint Horn

Box III Tierce Ranks

12⅘	Sub Tierce
6⅖	Tierce
3⅕	Tenth
1⅗	Seventeenth
V	Repeating Mixture (3⅕, 1⅗, ⅘, ⅖, ⅕)

Box IV Septième Ranks

9⅐	Sub Septième
4⅐	Septième
2⅐	Septième
1⅐	Flat 21st
V	Repeating Mixture (4⅐, 2⅐, 1⅐, ⅐, ⅐)

Henry Willis III to Dr, Alexander Russell (organist of the New York store and musical advisor to Rodman), 11 August, 1925:

> "Every stop should be a 'record breaker' and the effect of the whole stupendous."
> "This would be the only example in the World of a complete 32ft. Reed on the Manual."
> "If Mr. Wanamaker wants something that will astound the world, here is his chance!"

PROPOSAL II

Charles Courboin and George Till
October 1926
To be placed on the 5th floor directly above the String Organ.
66 ranks, 3,665 pipes

Stentor Organ

Manual stops

32′	Bombarde		25″
16′	Tuba Magna		50″
16′	Trombone		50″
16′	Double Trumpet		50″
16′	Contra Post Horn		50″
8′	Tuba Sonora		100″
8′	Tuba Mirabilis		100″
8′	Trombone I		75″
8′	Trombone II		75″
8′	Brass Trumpet		100″
8′	Muted Trumpet		50″
8′	French Horn I *fff*	[open tone]	75″
8′	French Horn II *fff*	[open]	75″
8′	French Horn III *fff*	[closed]	50″
8′	French Horn IV *fff*	[closed]	50″
4′	Tuba Clarion		100″
4′	Clarion Trumpet		75″
8′	Diapason Magna I	[double languid]	25″
8′	Diapason Magna II	[double languid]	25″
8′	Diapason Magna III	[double languid]	25″
8′	Diapason Magna IV	[double languid]	25″
4′	Octave [Scale 56]		15″
16? [*sic*]	Sesquialtera IX		15″
16′	Mixture XI		15″
4′	Cymbale VII		15″

Pedal

Manual to Pedal Unison Coupler

64′	Diaphonic Bombarde [unit]	50″
32′	"	
16′	"	
8′	"	
4′	"	
32′	Bombarde [from Manual]	
16′	Wood Trombone [unit]	50″
8′	"	
4′	"	
10⅔′	Quint	25″

MACY'S DEPARTMENT STORE

16′	Tuba Sonora [unit]	50″
8′	"	
4′	"	
16′	Diaphone [unit]	25″
8′	"	
16′	Open Diapason [unit]	25″
8′	"	
4′	"	
16′	Grand Mixture VI	15″

PROPOSAL III

G. Donald Harrison
Aeolian-Skinner Co.
December 1927
To be built in conjunction with the Wanamaker Organ Shop.
Cost of pipes and blowers only: $48,500
[ ] brackets indicate annotations in the proposal

Manual Stops

Flues on 25", reeds as noted

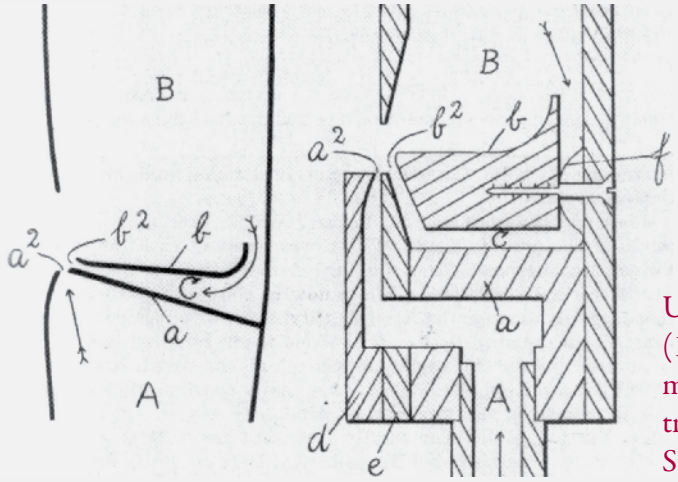
16′	Double Diapason [double languid]
16′	Double Clarabella
8′	Diapason No. 1 [2 ranks, double languid]
8′	Diapason No. 2 [2 ranks]
8′	Major Flute
5⅓′	Quint
4′	Octave
4′	Principal
3⅕′	Tenth
2⅔′	Octave Quint
2′	Super Octave
V	Grave Mixture (4, 2⅔, 2, 1⅓, 1)
VII	Cymbale [*prepared for*] (1⅓, 1, ⅔, ½, ⅖, ⅔, ¼)
IX	Grand Chorus (8, 5⅓, 4, 2⅔, 2, 1⅓, 1, ⅔, ½)
32′	Contra Fagotto [~~*prepared for*~~] 20″
16′	Bombarde 50″
16′	Contra Tuba 50″
8′	Double French Horn [closed] 50″
8′	Double French Horn [open] 50″
8′	Trombone 50″
8′	Tuba Sonora 50″
4′	Clarion 50″
8′	Tuba Mirabilis 100″
4′	Tuba Clarion 100″

Pedal Stops

Flues on 25", reeds on 50"

16′	Great Base (*sic*) [III ranks, double languid, wood & metal]
16′	Minor Bass II ranks [wood & metal] 25″
16′	Open Bass [16″ x 16″ wood]
10⅔′	Quint [wood]
8′	Octave II ranks [double languid, wood & metal]
8′	Principal [metal]
4′	Super Octave [metal]
VII	Harmonics [metal; 6⅖, 5⅓, 4, 3⅕, 2⅔, 2⅖, 2]
V	Fourniture
64′	Contra Bombarde [unit, metal]
32′	*Bombarde*
16′	Bombarde [French]
32′	Contra Trombone [unit, wood]
16′	Trombone
8′	Octave Trombone
16′	Ophicleide [unit, metal]
8′	Trumpet
4′	Clarion

SOURCES: Ray Biswanger, *Music in the Marketplace,* Friends of the Wanamaker Organ, Bryn Mawr, 1999, 169-181; Aeolian-Skinner correspondence.



U.K. Patent No. 25, 822 issued to Vincent Willis (1908), the patent drawing for double-languid metal and wood flue pipes. This construction yields tremendous power and figured prominently in the Stentor proposals of Courboin and Harrison.

ESSAY II BY **EDWARD W. FLINT**

An Unknown American Organ Builder William Boone Fleming

SOURCE: *The Diapason* (May 1971): 18.

WILLIAM BOONE FLEMING WAS BORN IN NEW BRUNSWICK, Canada, on November 2, 1849. He began work in organbuilding for George Ryder on October 4, 1874 in Boston. On July 26, 1881, he went to work for the Roosevelt firm in its Philadelphia branch and in 1889 moved to the New York factory. Frank Roosevelt sold the business, but not the name, in 1893 to Farrand & Votey. Fleming worked for this firm in Detroit until 1900, when the business moved to Garwood, New Jersey, under the name Votey Organ Co.

In September 1900, Fleming went to California, where he joined Murray M. Harris. The first Harris instrument with which he was involved was that built for Stanford University. The Harris firm was reorganized in 1903 as the Los Angeles Art Organ Co., Fleming becoming superintendent and director. It was this firm which built in 1904 the 140-stop Louisiana Purchase Exposition Organ to [George Ashdown] Audsley's basic specification. In 1905, the business was moved to Hoboken, N.J., and a year later was reorganized as the Electrolian Organ Co., of which Fleming was vice-president and superintendent and of which nothing further is apparently known today.

Following the Exposition, the organ, which had been intended to go to Kansas City, lay in storage until 1909, when on the advice of George Till it was purchased by John Wanamaker. Fleming was hired to supervise the installation in the Philadelphia store and began work there on September 1, 1909. Henceforth his role was that of designer of action work, George Till being chiefly concerned with tonal matters. In 1913 there began in the Wanamaker Shop, located on the top floor of that vast building, the construction of a large addition to the instrument and in 1924 yet another. Fleming retired in 1927 to Pasadena, California, and died in Altadena, Calif., at the age of ninety on April 26, 1940.

The collaboration of Fleming and Till was an uneasy one. Both were stubborn, egocentric men. They had begun the organ business in the days of tracker action (Fleming with Ryder, Till with Odell), but had readily taken up electropneumatic action by the turn of the century. Fleming's action work was "massive." He insisted on the finest materials and generally used "five screws where four would do." He boasted that his magnets would sustain a weight of ten pounds, which was true but functionally quite unnecessary. His design for the present six-manual console allowed a man to walk inside. Till scornfully asked "Where are you going to put the toilet, Fleming?" When charged that some of his action work was inaccessible for repair, he retorted, raising his right arm in a characteristic angry gesture, "Damn it, I build it so it doesn't need repair." He demanded sterling silver for both members of all contacts. His junction boards were made of machine-threaded brass plates, let into maple panels. The chests of the 1904 organ were of the ventil type, and only under pressure did he adopt in the latter additions a modified pitman chest. The wind supply was copious, even extravagant, the several blowers having, as of 1928, over 150 horsepower. In 1924, Henry Willis III visited the shop and expressed surprise that so much horsepower was needed, as compared with his Liverpool Cathedral organ which was blown by far less. Fleming's right arm went up as he replied, "Willis, anything you can do in England, we can do here." Some of the 1904 pneumatics, sized with egg-white, are still in use, whereas those of the 1927 combination action, which was built by an American commercial firm, have long since deteriorated.

Although George Till's province was supposed to be that of tonal work, he sometimes produced brilliant solutions to mechanical problems. The first winter the organ was used in the Philadelphia store, the heating system dried out the woodwork, causing numerous splits in wind trunks and chests. It was feared that the organ would be a total loss. Till proposed that a small stream of water be introduced into each blower intake. Fleming objected that it would ruin the organ. Till countered that the situation couldn't be any worse than it was. The experiment was tried; it worked; and it is still working today.

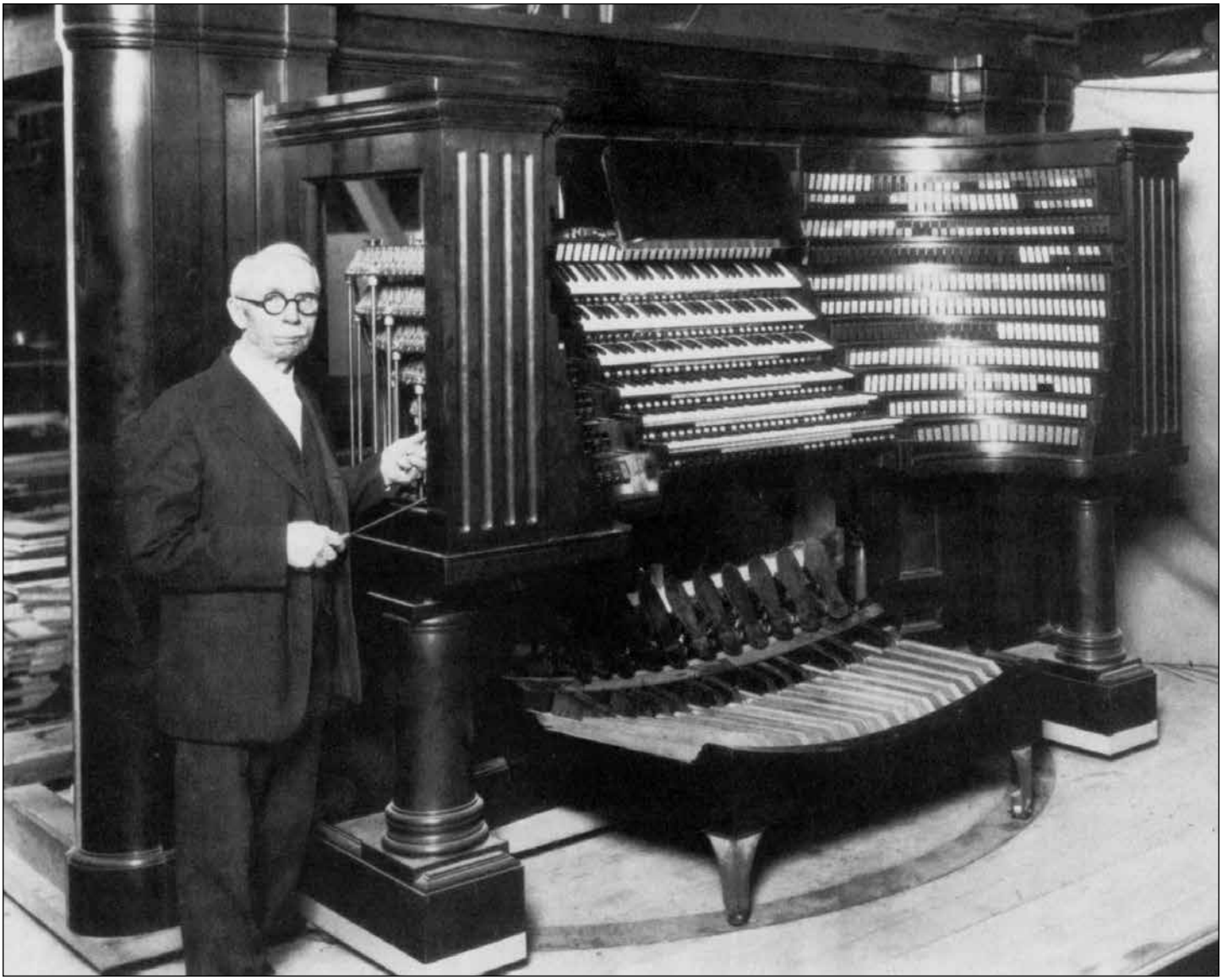
Fleming was a little man but he had great energy. On one occasion, in order to win a point about chest construction, he came to the shop very early for several days and single-handedly milled the lumber according to his specifications and then confronted his opponents with a *fait accompli*. He invariably wore a white necktie which belied his true character. He had made many of his own tools, including an ingenious geared screw driver that turned a right angle, and beautiful tools they were. In the early 1920s, he suffered a shock which would have put most men out of action, but he presently appeared in the shop on crutches, soon completely recovered. and was as usual the first man to appear in the morning and the last to leave at night. He used to boast that he had never fired a workman. Perhaps not, but he made life so miserable for the incompetent that they quit. He was opposed to drinking, not on moral grounds but because he had observed that workmen who drank were undependable. Nevertheless, he hired at Wanamaker's a cockney English pipemaker whom he had known at Roosevelt's and who was an unusually fine woodworker. Once a month this fellow would go on a week-long bender, and Fleming, knowing that he could not find as good a man elsewhere, grimly tolerated the absence.

As a young man Fleming had read Tom Paine, whose influence, augmented by some unhappy dealings with the clergy, led him to hold churchmen in low repute. He had a tart, sardonic, sometimes ribald, sense of humor. He relished a tale of once going to the Hook

& Hastings factory in Kendal Green to look up a youthful acquaintance. On inquiring if the man was then working there, he was told, "Ah, we had to let him go; he used to use church pews for improper purposes."

As a craftsman Fleming ranked among the finest. His ideas about action were ultra-conservative, though it never occurred to him to revert to tracker action. His musical sense was nil and his tonal ideas negligible. But he had integrity–integrity of craft and integrity in human relationships. One always knew exactly where he stood. His retirement from the Wanamaker shop at the age of 79 was the result of his unwillingness to compromise on points which he deemed important, and he offered his resignation with stoic pride. Rodman Wanamaker presented him with a handsome loving cup, and on December 17, 1928, the night before he left Philadelphia, Charles Courboin and Mary Vogt arranged a farewell dinner party. There, some of his shop associates, mellowed by (bootlegged) martinis, wine, and Benedictine, buried past differences and bade him an affectionate farewell.

EDITOR: Edward Flint was an employee of the Wanamaker Organ Shop during the 1920s, moving on to work in the organ maintenance field after the shop was closed. He became something of an organ historian and later a primary source for information regarding the organ's expansion during the 1920s and the principal players involved therein.



William Boone Fleming beside his ultimate creation under construction in the Wanamaker shop, 1927.

MACY'S DEPARTMENT STORE

Wanamaker Organ Mixture Compositions

SOURCE: Nick Myers

Compositions without breaks give starting pitches only.

PEDAL ORGAN

Grand Mutation X

C	16	10⅔	8	6⅖	5⅓	4	3⅕	2⅔	2	1⅗
g♯⁰	16	10⅔	8	6⅖	5⅓	4	4	3⅕	2⅔	2

Mixture VII

C	6⅖	5⅓	4	2⅔	2	1⅗

String Pedal Mixture XII [with individual stop actions]

C	(32)	16	16	10⅔	8	5⅓	4	2⅔	2	1⅗	1⅓	1

GREAT ORGAN

Mutation VIII [unenclosed]

C	16	10⅔	8	6⅖	5⅓	4	3⅕	2⅔

Mixture VII [enclosed]

C	2⅔	2	1⅗	1⅓	1	⅔	½
c⁰	4	2⅔	2	1⅗	1⅓	1	⅔
c¹	8	4	2⅔	2	1⅗	1⅓	1
c²	8	4	4	2⅔	2	1⅗	1⅓
c³	8	8	4	4	3⅕	2⅔	2

SWELL ORGAN

Mixture V [*not accessed*]

C	2	1⅓	1	⅔	½

Mixture VI

C	2⅔	2	1⅗	1⅓	1	⅔
f♯⁰	4	2⅔	2	1⅗	1⅓	1
f♯¹	8	4	2⅔	2	1⅗	1⅓

SWELL ORIGINAL STRING ORGAN

Corroborating Mixture V

C	1⅗	1⅓	1	⅔	½
c⁰	2	1⅗	1⅓	1	⅔
c¹	2⅔	2	1⅗	1⅓	1
c²	4	2⅔	2	1⅗	1⅓
c³	8	4	3⅕	2⅔	2

Viol Cornet IV

C	2⅔	2	1⅗	1	
c¹	4	2⅔	2	1⅗	

CHOIR ORGAN

Soft Cornet VI

C	2⅔	2	1⅗	1⅓	1	⅔
f♯¹	2⅔	2⅔	2	2	1⅗	1⅓
f♯²	3⅕	2⅔	2⅔	2	2	1⅓

SOLO ORGAN

Grand Mixture VI [*disassembled, not accessible*]

C	5⅓	4	2⅔	2	1⅓	1

Mixture VI

C	2⅔	2	1⅓	1	⅘	⅔
c♯²	4	2⅔	2	1⅓	1	⅘
f²	4	2⅔	2	2	1	⅘
c♯³	4	2⅔	2⅔	2	2	1⅗
c♯⁴	16	8	5⅓	4	3⅕	2⅔

Mixture V

C	4	2⅔	2	1⅗	1⅓
c♯³	4	2⅔	2⅔	2	1⅗
f♯³	4	4	3⅕	2⅔	2
c♯⁴	16	4	4	3⅕	2⅔

ETHEREAL ORGAN [*not accessed*]

Mixture IV

C	5⅓	4	2⅔	2	

ECHO ORGAN [*not accessed*]

Mixture VI

C	5⅓	4	2⅔	2	1⅗	1⅓

Cornet Mixture V

C	2⅔	2	1⅗	1⅓	1

STRING ORGAN

Dulciana Mixture [with individual stop actions]

C	2⅔	2	1⅓	1	⅔
c²	2⅔	2⅔	2	1⅓	1
f♯²	2⅔	2⅔	2	2	1⅓

ESSAY III BY SCOT HUNTINGTON

Wanamaker Organ Annuary

SOURCES: James Lewis, *The Los Angeles Art Organ Company,* OHS Press, 2012; Alan Laufman, *OHS Organ Handbook 1996, Philadelphia;* Ray Bizwanger, *Music in the Marketplace,* Friends of the Wanamaker Organ Press, 1999.

Murray M. Harris (1866–1922), born in Illinois, began apprenticeship with the Geo. S. Hutchings company in Boston where he meets Ernest M. Skinner, and learns all aspects of the business, excelling as a voicer. He is sent to Los Angeles by Hutchings as his sales agent in 1893, selling three organs to Pasadena and L.A. He opens his own factory in 1894 and by the time he builds his first three-manual organ in 1899, he has the only organ factory west of the Mississippi capable of building a complete organ and able to compete with Eastern concerns.

Murray M. Harris

With the signing of the contract for the Louisiana Purchase Exposition organ, a new 3-story factory is constructed, built to accommodate a workforce of 125 people. The company goes through several failures and reorganizations, the first with Harris's ouster from his own company by its investors after its financial failure connected with the building of the colossal Louisiana Purchase Exposition organ (known informally as the St. Louis World's Fair), and reorganized as the Los Angeles Art Organ Company, reorganized in 1905 after its failure and moved to Hoboken as the Electrolian Organ Co. specializing in residence organs, after that company's failure in 1906, Harris reorganizes that same year with a number of his original employees, again as Murry M. Harris, sold to Johnston Organ and Piano Co. in 1913 and moved to Van Nuys, reorganized as the California Organ Company in 1915, sold and reorganized as Robert Morton in 1917, a builder of especially distinguished theatre organs during the 1920s, closing for good in 1929 with the advent of talking pictures.

William Boone Fleming (1849–1940), born in Canada, apprentices with George Ryder in Boston in 1874, moving to the Hillborne Roosevelt company at their Philadelphia branch in 1881 and then to the N.Y. factory in 1889 with the death of Hilborne and the closure of the Philadelphia branch factory; and then to Detroit with Farrand & Votey after that firm buys out the Roosevelt interests in 1893. While in Detroit, he continued Roosevelt's pioneering work with electric action and becomes shop superintendent. When the Farrand partnership dissolved in 1897, Boone remains with Votey as that firm gets into the residence business doing pipe organ contract work for the Aeolian company, the later doing inventive work with self-playing organs through roll players, first with reed organs and later expanding to include pipe organs. Votey later merges business interests with the Aeolian company in 1899, but with Votey taking his interests to Hutchings in 1901, Fleming then moves to the Harris company with a number of key Votey employees.

Following the ouster of Harris by stockholders in 1903 due to the financial instability caused by the huge cost overruns for the St. Louis organ, for which stockholders were accessed $10 per share, the company is reorganized with Fleming as head. Fleming designs a double roll player for the Exposition organ using technology he acquired working with Aeolian, who sues for patent infringement and wins, preventing the machine to be demonstrated during the fair. With the collapse of the sale of the Big Organ to Kansas City, the LA Art company fails, and Fleming moves with several employees to Hoboken to form the Electrolian company, specializing in residence organs. Fleming's prices are too high to be competitive and the company collapses with no contracts within two years. Fleming goes to work for the Midmer company at Merrick, Long Island until he is hired by the Wanamaker store in 1909 to take charge of the installation of the organ in the Grand Court of the Philadelphia store. Until his forced retirement in 1927, Fleming was in charge of the organ's mechanical upkeep as well as its expansion. A friend of Audsley since the Wanamaker organ's inception as well as a disciple of the principles upon which the organ was originally built, Fleming keeps these concepts as a unifying thread as he masterminds successive enlargements.

George Washington Till (1866–1963), born in Philadelphia, he shows a mechanical aptitude at an early age. After working as a factory loom mechanic, he goes to work for the Odell organ company at the age of nineteen, remaining in their employ for nineteen years until he is offered a job by John Wanamaker to head a reed organ and piano tuning and service department in 1905. He is dispatched to St. Louis in 1909 by Wanamaker to access the Exposition Organ and to negotiate its acquisition.

George Till

While the purchase cost is still kept quiet today, it was incredibly low, known to be about 5% of the original cost, roughly $5,000-$6,000 dollars. Till oversees the packing of the organ into 11 railroad box cars, one especially long to accommodate the 32-foot pipework. While Fleming was the mechanical engineer, Till was the organ's tonal overseer, although he contributed mechanical inventions of his own from time to time. Till and Fleming's

joint tenure with the organ was characterized as a clash of titan egos although the final product is the result of their fruitful if uneasy collaboration. One of the great voicers of his era, Till is considered the guiding hand who martialed the organ's disparate forces together following multiple rebuilds, into the singular ensemble it remains today. Till retires in 1938.

George Ashdown Audsley (1838–1925) born in Scotland, received formal training as an architect, but was also well-known man of the Arts, as a painter, book illustrator, arbitrator of decorating design and taste, and after his emigration to the United States, a self-appointed authority on organbuilding. He was perhaps the first to style himself as an Organ Architect, preceding Emerson Richards in that regard by a generation. Until the advent of the internet and social media, arbitrators of organ taste have waged their battles of opinion in the pages of the organ press. Audsley was not the first but wrote frequently in the pages of music journals around the turn of the 20th century, putting forth new ideas which ran against the grain of traditional organbuilding. He was thus a known-entity among the musical cognoscenti when he was hired by the Harris company to lend his ideas and gravitas to the design of the "World's Largest Organ" for the Louisiana Exposition.

George Ashdown Audsley

His ideas don't seem so radical a century later, but they were part of the continued evolution of the organ toward a medium of symphonic expression, along with a growing musical taste in the organ transcription. The Big Organ afforded Audsley a blank canvas with which to express his ideas, hitherto before held at arm's length by the organbuilding establishment. Many of his written theories became reality with this organ: fistfuls of foundation tone and varied tone color from *pianissimo* to *fortissimo*, enclosure of all divisions, including the pedal (the lack of pedal enclosure in the Exposition organ was never fully realized to his life-long annoyance), solo stops of realistic orchestral tone, mixtures of the "compensating" type which were treated as harmonic collaborators rather than as power or ensemble builders, with fewer breaks or repeating pitches, and instead may run the keyboard gamut bottom to top without breaks to preserve the tessitura through the treble and getting softer as they ascend, with the highest pitches dropping out as they became too acute. His penchant for stop names in Italian (a peculiarity he shared with William Goodwin, a contemporary organ architect in Lowell, Massachusetts), were also not realized in a specification that was decidedly Americanized.

While Audsley was actually responsible for the design of only a small number of organs (including at the end of his life acting as an advisor to Philadelphia St. Mark's for a diapason chorus antiphonal organ), he was none-theless respected as a knowledgeable authority as a result of his extensive writings. While there is no evidence he had a hand in the expansion of the Exposition organ in the Philadelphia store, he was friendly with Fleming from his days as the organ's original designer–and who kept his organ theology intact through the organ's subsequent enlargements. Audsley's book, *The Art of Organ-Building* (in process for seven years), was being completed as the Exposition organ was under construction, and is today recognized as the premier publication on turn-of-the-century tonal thought and action technology.

1903 The Louisiana Purchase Exposition signs a contract with Murry M. Harris to build a 140-stop organ for the fair as their Opus 35, for $67,000. The event was to be a temporary affair, open April to December 1904 then demolished, built on a former swamp at the edge of town. Although it was essentially a stage set made from lathe, chicken wire, and stucco, it would have been tremendously grand, if a tad gaudy by modern taste: gleaming white Beaux Arts buildings outlined with electric lights, wide, grand boulevards, dancing fountains, and cascading waterfalls. All roads led to the Hall of Festivals; an over-decorated dome equal in size to that of St. Peter's Basilica and containing a 4,000 seat auditorium with the World's Largest Organ center stage. The effect of the whole affair upon the lowly fair-goer would have been electrifying. The original 1893 Ferris Wheel was moved here from Chicago, and the Ice Cream Cone made its debut. The organ needed a home afterwards, and it was arranged to go to the nearby Kansas City, Missouri convention hall (replacing a building only recently destroyed by fire).

Festival Hall

The exploding cost of construction needed to be partially alleviated by "leases" from each entity, assessed $15,000 each. Ultimately the cost of construction doubled, bringing the company to the brink of insolvency with the stockholders having to pick up the tab for the balance. Harris was ousted by angry stockholders who reorganized the company as the Los Angeles Art Organ Co. with William Fleming in charge. Now without Harris as the voicer and at Audsley's insistence, John W. Whitely, a former voicer for the Hope-Jones Organ Co. of Birkenhead, England, and later briefly a partner with William Thynne (formerly of the brief but famed partnership of Michell & Thynne), is hired to complete the voicing for the vast project. Whitely is especially known for the excellence of his string voicing, still

evident in what Fleming continued to call out of respect on subsequent consoles, the "Original String Organ". The three free-reed stops are ordered by Audsley from Laukhuff, and the majority of the reeds including the 32-foot Posaune, came from the Boston shop of Frederick I. White, an English-trained reed man originally brought to this country by George Hutchings, and who later established himself as a reed supplier to the trade. Fleming's pioneering work with electric action ventil chests transforms Harris's previous reliance on mechanical and tubular actions, and made the Big Organ technically possible.

The organ is delivered in sections to an unfinished building and struggles toward completion in the midst of carpenters and plasterers, and later rehearsals, concerts, and mobs of noisy fairgoers. Even at the September commencement of Alexander Guilmant's 40-recital series sold to sold-out houses, the organ is still without its most powerful Solo stops six months after the Exposition has opened. The organ is ultimately a success, winning a Gold medal, and Silver medals for Audsley and Fleming. During the fair season, every major organist of note in the country performed there, including Edwin Lemare and August Wiegand, although the complexity of the organ was said to have won the battle with a number of musicians. During the summer season, Kansas City reneges on its sale agreement, and without the city's backing for the instrument's final acquisition, the L.A. Art Co. files for bankruptcy. By October, recital attendance dwindles in the cold, unheated building. At the conclusion of the Exposition, the orphaned organ is relegated to warehouse storage in St. Louis, where it remains without prospects for five years.

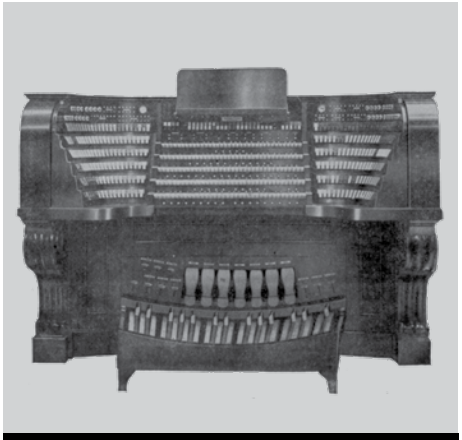
1910 Organ is acquired by John Wanamaker for installation in a grand new store in Philadelphia, to replace his original store the "Grand Depot". William Fleming is in charge of the project, George Till is in charge of the voicing, and a purpose-built organ shop occupies space on the 12th floor. Installed with its original façade intact, its appearance was not imposing enough for the Grand Court, so a new façade of dummy pipes is erected in front of it, restricting the effectiveness of the divisions standing behind it and now having to speak through a double facade. He also acquires the great Eagle from the 1904 Louisiana Exposition and installs it center court, firmly entrenched now as the prime fixture of Philadelphia culture.

1911 11 June, The organ is debuted in a grand "British" spectacle beginning at the exact moment of the coronation of King George V and Queen Mary. Shortly thereafter on June 22, the store itself is formally dedicated in a massive spectacle that includes President Taft. In spite of the cathedral-like proportions of the central Grand Court of Honor, the instrument does not sound anything like it did in St. Louis, and is perceived as under-whelming in the acoustic vastness of the anechoic chamber that is twelve floors of retail space surrounding the court. Immediately after its debut, George Till begins a program of pressure-raising and revoicing, further altering the organ away from its original tone.

No sooner is the organ installed in Philadelphia, its supremacy as "World's Largest" is challenged by a new Walcker in Hamburg and the announcement of a planned behemoth for Denver (ultimately not built). John Wanamaker orders the organ enlarged.

1914 4,000 pipes added

1916 New five-manual console with colored stop tabs and provision for further expansion



The 1916 console

1917 Another 3,000 pipes added, including the Ethereal division. Formerly 138 stops, the organ is now 219 stops and 293 ranks.

1919 Famed conductor Leopold Stokowski and the Philadelphia Orchestra, with young Belgian virtuoso Charles Courboin at the organ, dedicate the enlarged instrument before an audience of 12,000. Widor's Symphony VI is transcribed for organ and orchestra.

1921 18 November, Marcel Dupré makes his triumphant U.S. debut at the New York City store, and on 8 December in Philadelphia. Inspired by the organ he considered one of his most favored instruments after Saint-Sulpice, his improvisation stuns the capacity crowd. It was later transcribed, and the fiendishly difficult *Symphonie-Passion* is now one of the standards of the literature. Dupré returns in 1922, premiering the organ transcription of his popular piano work, *Cortège et Litanie,* and then premiering the organ and orchestra transcription of the same work at the store on his 1925 tour.

1922 12 December, John Wanamaker dies. One of the greatest philanthropists of his day, he leaves an estate estimated at $100 million dollars (over $1.6 billion in today's currency). His son Rodman is given sole control over the store empire. Businesses and schools in Philadelphia are closed the day of his funeral. Rodman now in charge, supports expansion of the organ in a symphonic direction.

1924 The Wanamaker Organ Shop builds and installs the String Organ at St. Mark's, the gift of Rodman Wanamaker, with W.W. Kimball pipework voiced by George Till.

1924 The large String Organ for the store's second massive organ expansion is begun, with pipework also provided by Kimball under the eye of their organ department head Robert Pier Elliot and head voicer George Michel, with on-site voicing by Till. The new *Vox Humana* chorus is made by Anton Gottfried of Erie.

1925 The young Belgian organist Charles Courboin (1884-1973) a favored recitalist at the store is rising in prominence as advisor the store's organ advisor, to the irritation of Fleming and Till. Courboin is friends with the noted English organbuilder Robert Pier Elliot, director of Kimball's organ department until he moves to Welte in 1925, and Courboin, continuing his loyalty to Elliot, sees that Welte is thereafter entrusted with future enlargement work, including the double-languid *Diapason Magna* on the Great (signed by its pipemaker

Henry Vincent Willis in 1927), new mixture chests for Swell and Solo, a portable two-manual organ for use with the antique string collection, and making sample pipes on 100-inch pressure for the proposed Stentor division.

Enrico Rossi, Nadia Boulanger, Courboin, Dupré, 1925

Robert Elliott

1926 The String and Orchestral departments are completed. There are fights about placement between Till and Courboin; Till loses and the Orchestral is installed behind the massive cornice above the case, to its lasting sonic detriment. Courboin is credited with adding many custom controls to the console, and while also taking credit for the tonal success after the completion of the enlargement, that credit actually belongs to George Till.

1926 The Welte company installs a massive remote combination action, which is almost immediately problematic. After years of perpetual unreliability and maintenance headaches, it is removed in 1943 leaving the organ without a combination action until a solid-state system is installed in 1988. A small fire in the new Orchestral organ does no serious damage there, but water damage from the sprinklers causes severe damage to the Great chests below it. Proposals for the Stentor Organ are solicited, with the one by Courboin and Till considered the most practical.

1926 November, Courboin is promoted to Head of the Organ Shop by Rodman Wanamaker (meaning a demotion for Fleming), frustrated by the slow pace of the enlargement progress and orders the enlargement project completed in one year.

1927 Fleming is forced into retirement at the age of 80 and before his new console is completed, likely at the behest of Charles Courboin. With the bankruptcy of Welte, Robert Elliot moves to Aeolian and his connection with the Wanamaker organ concludes.

1927 The Wanamaker Organ Shop replaces the windchest of the St. Mark's Screen Organ (Carlton Michell/Austin, 1902), with one built by Welte.

Rodman Wanamaker

1928 9 March, Rodman Wanamaker dies after a long illness. The contract for the Stentor Organ was on his desk awaiting his signature for what would be the crowning final glory of the immense organ. He passes over his wastrel son (John Rodman), for control of the store empire, assigning it to a family trust. The new managers cease all organ work immediately, except for projects already in progress. The huge six-manual console, with 729 stop tablets, Fleming's crowning achievement, is installed. Rodman Wanamaker's collection of over sixty priceless string instruments, including several Stradivarius violins, is sold to musical instrument entrepreneur Rudolf Wurlitzer, and dispersed. Courboin's appointment as Head of the Organ Department is rescinded.

1939 The young virtuoso Virgil Fox plays the organ for the American Guild of Organists Convention in a career-making performance, premiering his own transcription of Stokowski's transcription of the Bach chorale, *Komm Susser Todd,* to stupendous acclaim.

1940 William Fleming commits suicide by carbon monoxide poisoning at the age of 90.

1943 Charles Courboin resigns to accept the prestigious position as Director of Music at St. Patrick's Cathedral, New York City, a position he holds until his death in 1973. He is succeeded by his former assistant, Mary Vogt.

1948 Marcel Dupré makes his final appearance at the store.

1963 George Till dies.

1964 Virgil Fox records the organ in wideband fidelity stereo for the Command Classics label, including his transcription of *Come Sweet Death;* since reissued on CD.

Virgil Fox Recording

1966 Mary Vogt, on the store payroll as organist since 1917 and its longest-tenured employee, is coaxed into retirement, succeeded by the young virtuoso Keith Chapman.

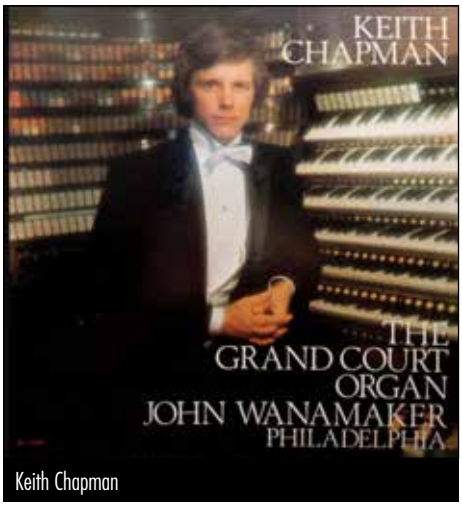
John Wanamaker display windows in the subway at 13th & Market Streets, Philadelphia, Pa., 1907. Antique postcard.

1978 The Wanamaker Trust sells the store to the Carter-Hawley-Hales chain for $60-million. The store is named a National Historic Landmark.

1986 With the Hale company's bankruptcy, the store is sold to Woodward & Lathrop. The historic artifacts are sold off and floors 6-12 are converted to office space.

1988 A new Peterson combination system is installed, giving the massive instrument a working combination action for the first time since 1935.

1989 29 June, Keith Chapman (1945–1989) and wife are killed in a plane crash in Colorado. Peter Conte appointed Chief Organist. In November the cable to the Echo is cut by a careless workman, and just a few weeks later, an 8th-floor water leak severely damages the Ethereal division.



Keith Chapman

1990-1996 Console disassembled and restored from the ground up. The stop tablet layout is simplified.

1991 14 February, another inattentive worker saws through a charged sprinkler pipe inundating the Echo division and sending water cascading into the Grand Court. In spite of strong financial support from the Woodward company, the non-profit group *Friends of the Wanamaker Organ* is formed to raise additional funding for the organ's continued upkeep and restoration.

1994 Woodward & Lathrop bankrupt. Restoration of the Echo division completed by Mann & Trupiano, Brooklyn.

1995 The Wanamaker Department Store is acquired by May Department Stores and rebranded as Hecht's. The iconic Crystal Tea Room is closed.

1997 After a brief rebranding as Strawbridges, Hecht's upgrades the store as the flagship of its luxury Lord & Taylor brand. The store is closed for extensive renovation changing the face of its interior retail space, which is further reduced to only the first three floors. The upper floors are walled off with glass, greatly improving the acoustics for the organ. The Organ Clearing House and friends are contracted to clean the main case in granular detail, and the façade pipes are repainted with gold-powder paint by the Quimby Organ Co.

2005 May Corp. and the Philadelphia store are acquired by Federated Department Stores and the store is rechristened the Macy's City Center in August 2006. The beloved 3rd-floor Terrace Restaurant immediately opposite the organ and the prime place to experience it, is closed. *Centennial Tuba* on 25″ added to Stentor Organ.

2008 The Philadelphia Orchestra returns to the store for the first time in decades for the Philadelphia premiere of the Jongen *Symphony Concertante (1926),* on the organ for which it was originally composed but never performed. Just weeks away from its scheduled premiere, the concert was unceremonious cancelled by the new store managers immediately following Rodman's death.

2013 A new custom-designed *Opus-Two* solid-state control system is brought on-line in July.

2019 The main organ case is restored to its original coloring and appearance, and the façade pipework is regilded in gold leaf, the cost underwritten by various grants.

2022 The organ's restoration is on-going, gradually undoing various tonal changes made since 1927.

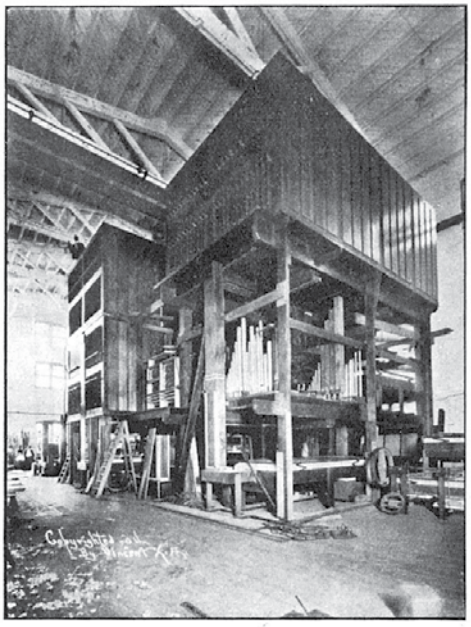
George Till's curatorial successors have been: Henry Baeker, William Ruff, John McCormack, Nelson Beuchner, Peter van der Spek, and Curt Mangel. Matthew Taft is the present Curator.

THE LARGEST ORGAN IN THE WORLD

This promotional pamphlet written by the organ's designer, George Ashdown Audsley, was produced by the builder, the Los Angeles Art Organ Co., to describe the monumental instrument they built for temporary display at the Louisiana Purchase Exposition, also known as the St. Louis World's Fair, prior to its 1904 installation in the exposition's locus point, the Hall Of Festivals. The marketing intention no doubt, was to generate interest among musical lovers and potential customers prior to the grand opening, for in the day, the fair was the most eagerly anticipated event of the young century. The 3½" x 6¼" booklet is reproduced here in facsimile.

The Largest Organ In the World

Built by
Los Angeles
Art Organ Co.
Los Angeles
Cal.



ASSEMBLING — GRAND CONCERT ORGAN.

DESCRIPTION

OF THE

GRAND CONCERT ORGAN

TO BE ERECTED IN

FESTIVAL MUSIC HALL

OF THE

LOUISIANA PURCHASE EXPOSITION

PREVIOUS TO ITS INSTALLATION IN

CONVENTION HALL

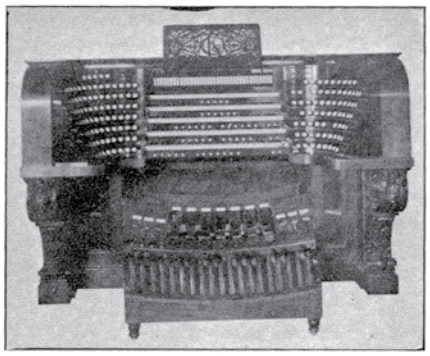
KANSAS CITY, MISSOURI

BY GEORGE ASHDOWN AUDSLEY, F. R. I. B. A.

The Festival Music Hall of the Louisiana Purchase Exposition will contain the Grandest Concert Organ ever constructed in the world. This organ is built for the Kansas City Convention Hall, where it will be erected in its permanent home at the close of the Exposition. It will not only be the largest Organ ever built, but it will inaugurate an entirely new and advanced system of Tonal Appointment and Classification, which will place this remarkable Organ beyond comparison with all concert-room Organs in existence, which, from first to last, display no departure from the old style of tonal appointment and disposition, and which for concert purposes and the proper rendition of orchestral scores or transcriptions are hopelessly insufficient.

The system upon which the tonal appointment and disposition of the Grand Concert Organ has been schemed was first submitted to the musical world in a series of articles published in an English scientific journal during the years 1887 and 1888, from the pen of an organ expert of international fame. No European builders, with their circumscribed ideas and conservative habits, have considered it desirable to move out of their old-fashioned and traditional grooves, and avail themselves of the valuable and progressive suggestions freely offered them. It is a notable fact that the largest Concert-room Organ at present in existence, constructed by an English firm, shows absolutely no departure from old ideas of tonal apportionment; indeed, it shows a retrograde rather than a progressive movement.

It has, accordingly, been left to the Los Angeles Art Organ Company to grasp the situation; to repudiate the old-fashioned methods followed by the representative organ-builders of both Europe and America, and to inaugurate the new and only truly artistic system of tonal appointment and logical disposition which has been formulated



5-MANUAL CONSOLE — GRAND CONCERT ORGAN.

up to the present year of Grace. It is not too much to say that when the Grand Concert Organ is erected in the Festival Music Hall, and has been performed upon by musicians of international reputation, the whole organ-building and organ-loving world will recognize the utter break-down of the old inartistic methods; and the virtuoso will find a new world of tonal

effects at his disposal, hitherto impossible on the largest and finest of previously existing Organs at home and abroad.

Although it is impossible, within the limits of a popular and necessarily brief description like the present, to go fully into all the details of the scheme of which the Grand Concert Organ is the first practical exponent, a few words of an untechnical character may be said respecting the new tonal appointment and disposition above alluded to.

The Organ consists of two departments, namely: the manual department, commanded by the hands of the performer, and the pedal department, commanded by the feet of the performer. The manual department, comprising one hundred and ten speaking stops, and eight thousand, nine hundred and seven pipes of metal and wood, is controlled by five claviers of sixty-one keys each. Each clavier commands a separate tonal division of the Organ, designated, respectively, the First or Great Organ, the Second or Choir Organ, the Third or Swell Organ, the Fourth or Solo Organ, and the Fifth or Echo Organ. The Great and Swell Organs have each two subdivisions called for by the new system of tonal apportionment.

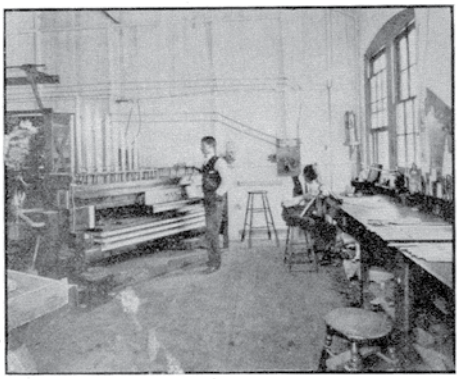
The first subdivision of the Great Organ is entirely unexpressive, and contains all the foundation stops and diapason work of the Organ proper, including only one imitation stop, belonging to the 32 feet harmonic series, and called for by the presence of the sub-principal

32 feet of metal. This first subdivision contains 13 speaking stops, and forms the foundation organ tones of the entire instrument.

The second subdivision is inclosed in a swell box (No. 1), and is, accordingly, entirely flexible and expressive. It contains the stops belonging to the 16 feet and 8 feet harmonic structures, and the three important reed stops of the division. The value of this subdivision, in its flexible and expressive form, cannot be overestimated. It multiplies the tonal effects of the Great Organ ten-fold, and produces effects absolutely impossible on the largest unexpressive Great Organ ever constructed. To render this expressive subdivision of maximum value, and immediately available for sudden changes of tonality, and the most subtle nuances, it is commanded when desired by the double touch of the clavier. Through the agency of the double touch a slightly increased pressure on the keys by the fingers of the performer will instantly add, in combination, the voices of any stops drawn in the expressive subdivision; and that addition can be made to any note or group of notes under the fingers of the performer. This mechanical expedient obtains in no existing Organ in the United States, and in no first-class Concert-room Organ in the world. Apart from the wonderful tonal effects producible by the double touch, the powers possessed by this Great Organ, with its two subdivisions of 13 speaking stops each, is far beyond comparison, both as regards richness and variety of tone, with the corresponding

manual division of any Organ that has ever been built.

The Second or Choir Organ is the chief accompanimental division of the instrument under consideration, while it is capable of producing many remarkable tonal combinations and solo effects of a refined character. In concert-room Organs, designed on the old-fashioned lines, the



VOICING ROOM.

so-called Choir Organ is merely a soft-toned, diminutive Great Organ, invariably devoid of complete powers of expression and flexibility. There is not a single concert-room in Europe that has its Choir Organ entirely flexible and expressive; while, thanks to the genius and pro-

gressive mind of the late Hilborne L. Roosevelt, the treatment made its appearance in this country. No attempt, however, has been hitherto made to apportion the stops to this division with a definite aim and with respect to the apportionment throughout the other manual divisions.

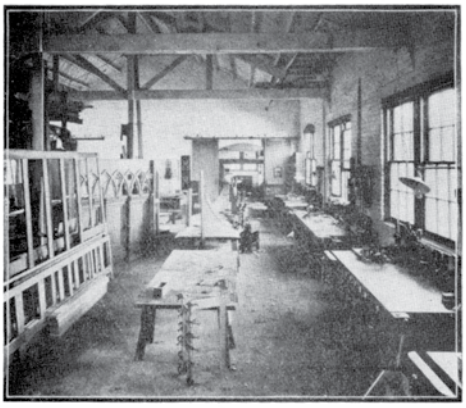
The Choir Organ contains twenty stops, comprising every quality and strength of tone requisite for refined and varied accompaniment. Its appointment is unique, and has no point in common with the tonal appointments of the other divisions of the instrument. To avoid the senseless repetition which obtains in Organs built on old lines, the reed stops are constructed with free tongues, giving a singular smoothness and sweetness to their tones, as well as individuality.

The entire Choir Organ is inclosed in Swell Box No. 1, and is, accordingly, entirely flexible and expressive.

The Third or Swell Organ in all its tonal aspects and apportionments is absolutely unique, and is of such a character as to place the Grand Concert Organ in the Festival Music Hall far in advance of all Organs previously constructed. It presents the first important and artistic step toward the perfect Concert Organ, for the adequate interpretation of orchestral scores under the command of the consummate musician and musical virtuoso. The Swell Organ contains thirty-four speaking stops, and two thousand, eight hundred and sixty-seven pipes. The stops are apportioned in two subdivisions, both of which are inclosed in special swell boxes (Nos.

2 and 3), and are entirely expressive and flexible.

The First Subdivision, comprising twenty-three stops and one thousand, five hundred and eighty-six pipes, differs entirely in its constitution from the previously described divisions, introducing for the first time the true orchestral element



CASE ROOM.

from which the Grand Organ derives its unique and advanced position among the great Concert-room Organs of the world. In this First Subdivision are grouped all the stops which represent the wood-wind instruments of the Grand

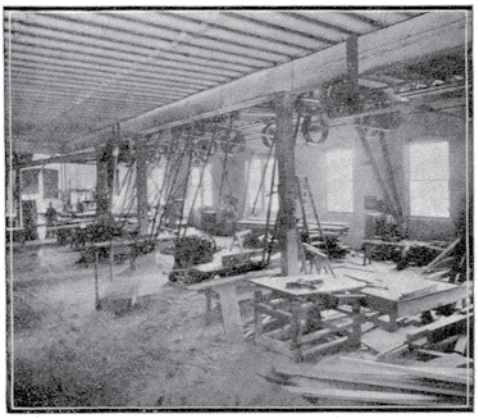
Orchestra, namely, the Flutes, Piccolo, Clarinet, Oboe, Corno di Bassetto, Fagotto and Contra-gotto. To these special stops are added the Horn and Violin Diapasons, a fairly complete family of covered stops, and several open Flute-toned stops. The entire appointment of this subdivision has been schemed to develop the imitative wood-wind forces of the Organ. To the stops above named are added the Horn and Vox Humana.

The Second Subdivision of the Swell has no counterpart in any Organ ever built. It overcomes the marked deficiency which destroys the value, from a musical point of view, of all the concert-room Organs in the world. In these old-fashioned Organs it is impossible, even with coupling all the claviers, to obtain an adequate volume and proper character of imitative string-tone. The Second Subdivision now under consideration contains eleven imitative sub-octave, unison, and harmonic-corroborating stops, and one thousand, two hundred and eighty-one pipes, every one of which is of string tone. All the stops are scientifically proportioned in strength of tone, so as to produce the volume of rich compound sound characteristic of the string division of the Grand Orchestra. All the stops save the Contra-Basso, 16 feet, and the Violoncello, 8 feet, are made of pure tin and to special scales. They comprise a Viol Cornet, composed of four through, string-toned ranks, and a Corroborating Mixture, composed of five ranks representing the high upper partial tones of the unison pitch of the subdivision. It can readily be

realized from even the above few words that the Grand Concert Organ will have a tonal section not only unique, but capable of producing musical effects never before heard outside the Grand Orchestra. This remarkable subdivision is inclosed in an independent swell box (No. 3), and can be brought on or thrown off the third clavier by thumb pistons; and is also connected with the clavier by the double touch of the Swell Organ. By the unique tonal apportionment and the double expressive powers of this division, the orchestral effects it can alone produce under the hands of the virtuoso will transcend everything hitherto possible on the largest Organ. A book could be written on the countless tonal effects possible on this compound, expressive division alone. It may be interesting to learn that with the thirty-four speaking stops contained in this compound division, no fewer than seventeen billion, one hundred and seventy-nine million, eight hundred and sixty-nine thousand, one hundred and eighty-three (17,179,869,183) distinct tonal and expressive combinations or effects are possible, without resort to octave or sub-octave coupling, or any multiplying device whatever. Some idea can be formed of the number of tonal effects above given when it is calculated if a different combination was drawn every minute, day and night, it would require above thirty-two thousand six hundred years to complete the performance.

The Fourth or Solo Organ is, as its name implies, devoted to the imitative solo stops; while

it also represents the brass-wind division of the Grand Orchestra. Here are placed such stops as the Orchestral Flute, Orchestral Clarinet (of two ranks), Orchestral Trumpet, Trombone, Bass Tombrone, Tuba and Bass Tuba, supported by ten powerful stops suitable for combination with the imitative and orchestral voices of the



WOOD WORKING DEPARTMENT.

division. The stops above alluded to speak on wind of 7 inches, 10 inches and 20 inches pressure.

The Solo Organ is entirely expressive, being inclosed in a special swell box (No. 4.) Here

the inartistic and absurd practice of leaving the high-pressure reed stops outside the swell box and, accordingly, devoid of flexibility and powers of expression, is for the first time done away with in a Concert Organ of the first class.

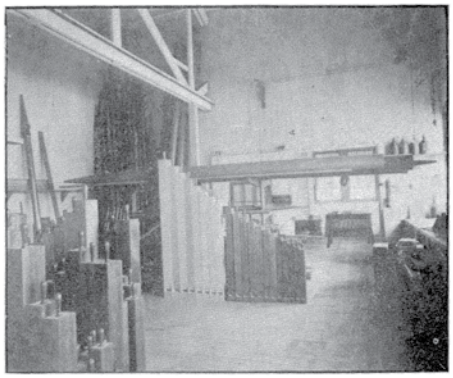
The Fifth or Echo Organ contains twelve speaking stops, chiefly of delicate intonation, suitable for distant and echo effects, to which is added a Vox Humana, of two ranks of pipes, and unique construction. This division is inclosed in a special swell box (No. 5), and is located at a distance from the main portion of the instrument.

The Pedal Organ is the largest and the most complete ever constructed. It is provided with all the leading varieties of unimitative and imitative tone, and is, accordingly, capable of furnishing appropriate basses for all the classes of manual combinations. Its tones range from that of the Dulciana to that of the full strength of the department of thirty speaking stops, and one thousand, one hundred and fifty-two pipes.

In addition to the above unique tonal appointment and apportionment, the Organ is provided with thirty-six couplers by means of which the five manual claviers are coupled to the Pedal Organ clavier; and by means of which the five manual claviers are connected together in twenty-five different relations, or, including subdivisions, twenty-eight different relations. There are eight Pedal Organ couplers; eleven manual unison couplers, seven sub-octave couplers, and ten octave couplers — an array of couplers never before approached in any Organ in the world.

There are five Tremulants acting on the five expressive divisions and subdivisions, exclusive of the expressive subdivision of the Great Organ.

There is an adjustable Combination System for the entire Organ, commanded by forty-six push buttons located between the manual claviers, and there are ten pedal movements chiefly controlling the vast expressive powers of the



DECORATING ROOM.

instrument — expressive powers that far exceed those of any other Organ in the world.

The entire Organ is fitted with the Fleming Patent Individual Valve Electro-Pneumatic Action, which for promptness and certainty of operation and durability stands at the head of electro-pneumatic actions.

The instrument will be played from two independent Consoles of the most perfect construction and design. The most important Console is movable, and is connected to the Organ by an electric cable one hundred and fifty feet long. This Console contains the radiating and concave pedal clavier; the five manual claviers; the one hundred and forty draw stop knobs; the five Tremulant draws, and the thirty-six Coupler draws, the forty-six push buttons belonging to the Adjustable Combination System; and all the foot pedals controlling the expressive powers of the whole Organ, etc., etc. This Console is for the Virtuoso who performs in the usual manner with hands and feet.

The second Console is stationary, and is entirely devoted to the builders' Patent Double-Roll Automatic Self-Playing Attachment — the only reliable and sufficient self-playing attachment invented for the Pipe Organ. Through the agency of the double or twin rolls, the most complicated orchestral scores can be rendered with absolute accuracy; and compositions can be performed which are far beyond the powers of the most accomplished organist. This Console resembles that first described, except that it does not possess the manual and pedal claviers, which are not necessary where the Double-Roll, Self-Playing Attachment appears. It is difficult and, indeed, well nigh impossible, to realize what can be achieved in the world of music through the agency of this wonderful Console. Within its arms, so to speak, sits the musician, entirely unembarrassed with the calls of six Claviers

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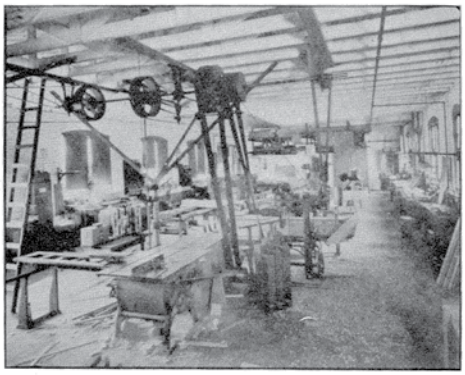
upon his hands and feet, having at his immediate command the vast tonal forces (represented by ten thousand pipes) of this gigantic Organ; his hands simply engaged in manipulating the draw-stop knobs and combination buttons, and his feet controlling the flexible and expressive powers of



CHEST ROOM.

the instrument. The Double Rolls do all the rest with a precision absolutely beyond the playing powers of the most skillful executant.

It will be seen from the above brief and very sketchy description that the Grand Concert Organ, when erected in the Festival Music Hall and Convention Hall, will take its place as the most complete and perfect Organ ever fabricated by

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the hand of man. It will place through its remarkable and unique tonal appointment and apportionment its marvelous and compound powers of expression, and its duplex system of control, all the other organs in the world as old-fashioned and out-of-date instruments.

PIPE ROOM.

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SPECIFICATION OF THE GRAND CONCERT ORGAN

PEDAL ORGAN.

CCC to C — 32 Notes.

M—Metal. W—Wood. R—Ranks.

			Feet
1	Gravissima (result two lower octaves)	W	64
2	Double Open Diapason (from Gt. No. 1)	M	32
3	Double Open Diapason	W	32
4	Contra-Bourdon	W	32
5	Open Diapason	W	16
6	Open Diapason	M	16
7	Violone	M	16
8	Gamba	M	16
9	Dulciana (express., from Ch. No. 1)	M	16
10	Bourdon	W	16
11	Lieblichgedeckt (expressive, from Sw. No. 12)	W	16
12	Contrafluto	W	16
13	Quintaten	W	16
14	Quint	W	10 2-3
15	Octave	M	8
16	Dolce	M	8
17	Violoncello	M	9
18	Bass Flute	W	8
19	Weitgedeckt	W	8
20	Super-Octave	M	4

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		Feet
21 Offenflote	W	4
22 Compensating Mixture	M	VI R.
23 Contra-Bombarde	W	32
24 Bombarde	M	16
25 Contra-Posaune	M	16
26 Contrafagotto (expressive, from Sw. No. 26)	W	16
27 Euphonium (free reed)	M	16
28 Tromba	M	8
29 Fagotto	M	8
30 Clarion	M	4

FIRST OR GREAT ORGAN

CC to c4 — 61 Notes.

FIRST SUBDIVISION — UNEXPRESSIVE.

M—Metal. W—Wood. R—Ranks.

		Feet
1 Sub-Principal	M	32
2 Double Open Diapason	M	16
3 Contra-Gamba	M	16
4 Sub-Quint	W	10 2-3
5 Grand Principal	M	8
6 Open Diapason, Major	M	8
7 Open Diapason, Minor	M	8
8 Open Diapason	W	8
9 Grand Flute	W	8
10 Doppelflote	W	8
11 Gamba (pure tin)	M	8
12 Octave, Major	M	4
13 Gambette	M	4

SECOND SUBDIVISION— EXPRESSIVE

Inclosed in Swell Box No. 1.

14 Grobgedeckt	W	8
15 Harmonic Flute	M	8

		Feet
16 Quint	M	5 1-3
17 Octave, Minor	M	4
18 Harmonic Flute	M	4
19 Tierce	M	3 1-5
20 Octave Quint	M	2 2-3
21 Super Octave	M	2
22 Grand Cornet IV. Ranks — Seventeenth	M	1 3-5
22 Grand Cornet IV. Ranks — Nineteenth	M	1 1-3
22 Grand Cornet IV. Ranks — Septieme	M	1 1-7
22 Grand Cornet IV. Ranks — Twenty-second	M	1
23 Grand Mixture	M	VII R.
24 Double Trumpet	M	16
25 Harmonic Trumpet	M	8
26 Harmonic Clarion	M	4

This Expressive Subdivision can be brought on or thrown off Great Organ clavier by thumb pistons, and it is also commanded by the Double Touch of the clavier, at the will of the performer.

SECOND OR CHOIR ORGAN—EXPRESSIVE

CC to c4 — 61 Notes.

Inclosed in Swell Box No. 1.

M—Metal. W—Wood. R—Ranks.

		Feet
1 Double Dulciana	M	16
2 Open Diapason	M	8
3 Geigenprincipal	M	8
4 Salicional (pure tin)	M	8
5 Keraulophone	M	8
6 Dulciana	M	8
7 Vox Angelica	M	8
8 Vox Celestis	M	8

		Feet
9 Quintadena	M	8
10 Stopped Diapason	W	8
11 Concert Flute	W	8
12 Flauto d'Amore	W & M	4
13 Salicet (pure tin)	M	4
14 Piccolo	M	2
15 Dulciana Cornet	M	VI R.
16 Contra-Saxaphone	M	16
17 Saxaphone	W	8
18 Corno Inglese	M	8
19 Musette	M	4
20 Carillon (Tublar bells)	M	

This Division of the Organ is commanded by the direct action of its own clavier, and is also commanded by the clavier of the Great Organ through the Double Touch of that clavier.

THIRD OR SWELL ORGAN

CC to c4 — 61 Notes.

FIRST SUBDIVISION — EXPRESSIVE.

Inclosed in Swell Box No. 2.

M—Metal. W—Wood. R—Ranks.

		Feet
1 Lieblichgedeckt	W	16
2 Horn Diapason	M	8
3 Violin Diapason	M	8
4 Grossflote	W	8
5 Clarabella	W	8
6 Doppelrohrgedeckt	W	8
7 Melodia	W	8
8 Flute Harmonique	M	8
9 Dolce	M	8

		Feet
10 Gedecktquint	M	5 1-3
11 Octave	M	4
12 Flute Harmonique	M	4
13 Piccolo Harmonique	M	2
14 Full Mixture (with covered ranks)	M	VI R.
15 Contrafagotto	W	16
16 Contra-Oboe	M	16
17 Fagotto	W & M	8
18 Orchestral Oboe	M	8
19 Clarinet	M	8
20 Corno di Bassetto	M	8
21 Horn	M	8
22 Vox Humana (two ranks)	W & M	8
23 Octave Oboe	M	4

This First Subdivision can be brought on or thrown off the Swell Organ clavier by thumb pistons.

SECOND SUBDIVISION—EXPRESSIVE

Inclosed in Swell Box No. 3.

M—Metal. W—Wood. R—Ranks.

		Feet
24 Contra-Basso	W	16
25 Violoncello	pure tin	8
26 Viola	"	8
27 Violino	"	8
28 Violino (tuned slightly sharp)	"	8
29 Tiercena	"	8
30 Quint Viol	"	5 1-3
31 Octave Viol	"	4
32 Violette	"	4

			Feet
33 Viol Cornet IV. Ranks	Viol, muted	"	2 2-3
	Viol, "	"	2
	Viol, "	"	1 3-5
	Viol, "	"	1
34 Corroborating Mix. (string tone)		"	V R.

This Second, String-toned Subdivision can be brought on or thrown off the Swell Organ clavier by thumb pistons; and it is also commanded by the Double Touch of the clavier.

FOURTH OR SOLO ORGAN—EXPRESSIVE

CC to c4 — 61 Notes.

Inclosed in Swell Box No. 4.

M—Metal. W—Wood. R—Ranks.

			Feet
1 Double Open Diapason	M		16
2 Flute a Pavillon	M		8
3 Stentorphone	M		8
4 Grossgambe (pure tin)	M		8
5 Grossflote	W		8
6 Doppeloffenflote	W		8
7 Orchestral Flute	W		8
8 Harmonic Flute	M		4
9 Octave	M		4
10 Grand Cornet	M	IV, V & VI	R.
11 Bass Trombone	M		16
12 Bass Tuba	M		16
13 Trombone	M		8
14 Ophicleide	M		8
15 Orchestral Trumpet	M		8

			Feet
16 Orchestral Clarinet (2 ranks)	W & M		8
17 Harmonic Clarion	M		4
18 Drums			

FIFTH OR ECHO ORGAN—EXPRESSIVE

CC to c4 — 61 Notes.

Inclosed in Swell Box No. 5.

M—Metal. W—Wood. R—Ranks.

			Feet
1 Stillgedeckt	W		16
2 Echo Diapason	M		8
3 Nachthorn	M		8
4 Spitzflote	M		8
5 Viola d'Amore	M		8
6 Harmonica	W		8
7 Unda Maris	M		8
8 Flauto d'Amore	W		4
9 Gemshorn	M		4
10 Echo Cornet	M	V	R.
11 Echo Trumpet	M		8
12 Vox Humana (two ranks)	W & M		8

This Organ is to be located at a considerable distance from the main portion of the instrument.

MECHANICAL APPLIANCES

PEDAL COUPLERS.

1 Great Organ, 1st subdivision, to Pedal Organ
2 Great Organ, 2nd subdivision, to Pedal Organ
3 Choir Organ to Pedal Organ
4 Swell Organ, 1st subdivision, to Pedal Organ

5 Swell Organ, 2nd subdivision, to Pedal Organ
6 Solo Organ to Pedal Organ
7 Echo Organ to Pedal Organ
8 Pedal, Octave Coupler on itself

MANUAL COUPLERS

UNISON COUPLERS.

1 Choir Organ to Great Organ
2 Swell Organ, 1st subdivision, to Great Organ
3 Swell Organ, 2nd subdivision, to Great Organ
4 Solo Organ to Great Organ
5 Echo Organ to Great Organ
6 Swell Organ, 1st subdivision, to Choir Organ
7 Swell Organ, 2nd subdivision, to Choir Organ
8 Solo Organ to Choir Organ
9 Echo Organ to Choir Organ
10 Solo Organ to Swell Organ
11 Echo Organ to Swell Organ

SUB-OCTAVE COUPLERS.

1 Swell Organ, 2nd subdivision, to Great Organ
2 Choir Organ to Great Organ
3 Solo Organ to Great Organ
4 Great Organ, Sub-Octave Coupler on itself
5 Swell Organ, Sub-Octave Coupler
6 Choir Organ, Sub-Octave Coupler on itself

OCTAVE COUPLERS.

1 Choir Organ to Great Organ
2 Swell Organ, 1st subdivision, to Great Organ
3 Swell Organ, 2nd subdivision, to Great Organ
4 Solo Organ to Great Organ
5 Echo Organ to Great Organ
6 Great Organ, Octave Coupler on itself

7 Choir Organ, Octave Coupler on itself
8 Swell Organ, Octave Coupler on itself
9 Solo Organ, Octave Coupler on itself
10 Echo Organ, Octave Coupler on itself

TREMOLANTS.

1 Tremolant to Choir Organ
2 Tremolant to 1st subdivision of Swell Organ
3 Tremolant to 2nd subdivision of Swell Organ
4 Tremolant to Solo Organ
5 Tremolant to Echo Organ

ADJUSTABLE COMBINATION ACTION.

Commanded by thumb pistons located between the manual claviers.

1 2 3 4 0	Operating on First Subdivision of Great and Pedal
1 2 3 4 0	Operating on Second Subdivision of Great and Pedal
1 2 3 4 5 0	Operating on First Subdivision of Swell and Pedal
1 2 3 4 5 0	Operating on Second Subdivision of Swell and Pedal
1 2 3 4 5 6 0	Operating on Choir and Pedal
1 2 3 4 5 0	Operating on Solo and Pedal
1 2 3 4 0	Operating on Echo and Pedal
1 2 3 4 5 6	Operating on any combinations of stops or solo stops as may be desired
General Release	
Pedal Release	

PEDAL MOVEMENTS.

1 Balanced Expression-pedal to Swell-box No. 1
2 Balanced Expression-pedal to Swell-box No. 2

3 Balanced Expression-pedal to Swell-box No. 3
4 Balanced Expression-pedal to Swell-box No. 4
5 Balanced Expression-pedal to Swell-box No. 5
6 Locking-pedal connecting all Expression-pedals to Expression-pedal No. 1.
7 Balanced Crescendo-pedal, operating on each Manual Division separately
8 Balanced Crescendo-pedal, operating on the Full Organ and all Couplers
9 Locking-pedal, reducing the Pedal Organ from forte to piano
10 Reversible Pedal, operating Great Organ to Pedal Organ

SUMMARY.

PEDAL ORGAN	.....	30	Stops	.....	1152 Pipes
GREAT	"	26	"	.....	2135 "
CHOIR	"	20	"	.....	1501 "
SWELL	"	34	"	.....	2857 "
SOLO	"	18	"	.....	1367 "
ECHO	"	12	"	.....	1037 "
Total Speaking Stops.		140	Pipes		10,059

Mechanical Appliances, 99, as above set forth

The following particulars respecting the Wind-collecting and Wind-distributing portions of the Organ will be interesting to all lovers of the "King of Instruments."

There are five bellows for the main manual and pedal departments of the Organ, each measuring 12 feet long by 6 feet wide, and having three

square feeders actuated by a most perfect system of crank-shafting.

In addition to the five main bellows, every division and subdivision of the Organ has a regulating reservoir, giving wind of the required pressure. These regulators deliver wind of 4½, 7, 10 and 20-inch pressure.

The Echo Organ has a special bellows, measuring 12 feet long by 4 feet 3 inches wide, and having three feeders actuated by a three-throw crank-shaft.

All the mechanism connected with the wind-supply of the Organ will be of the highest class, having every known appliance to prevent undue friction and to lubricate automatically.

The bellows of the main portion of the Organ will be operated by two 10 H.P. motors of 220 volts, direct current. The Echo Organ bellows will be operated by 1½ H.P. motor of 220 volts, direct current.

The Wind-chests, through which the wind from the regulators is distributed to the one hundred and forty speaking stops, and the ten thousand and fifty-nine pipes, are 12 feet long and of widths sufficient to give every rank of pipes planted thereon ample speaking room. The chests require in their construction 20,000 feet of lumber. The bellows and regulators consume 8000 feet, and the Wind-trunks connecting them to the Wind-chests consume an additional 2000 feet of lumber.

The Swell Boxes, five in number, are constructed on the most liberal scale, giving ample

room for tuning and regulating every pipe inclosed. They are heavy, double-panneled and made of the finest quality of Sugar Pine; 7500 feet of pine are used in their construction.

Every portion of the wood work throughout the Organ is of the highest quality and finished in the most careful and workmanlike manner.

The Organ is constructed under the Fleming Electro-Pneumatic System, which gives the most satisfactory results.

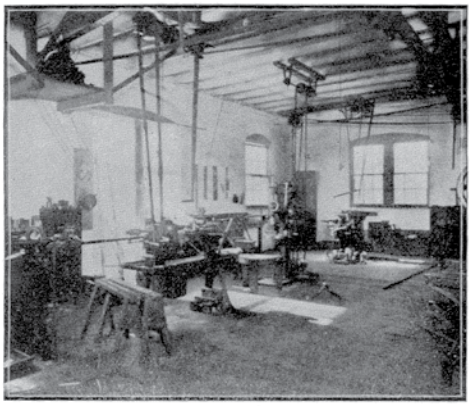
The Organ will contain 1300 magnets for both key and draw stop actions. There will be 130 miles of wire in magnets and cables, from No. 20 up to No. 34, B. & S. gauge.

There will be five automatic electric swell engines for the actuation of the swell shutters.

There are above seven thousand open circuits in the Organ. The company's special contact wire, costing $10.80 per pound, is used in the key and coupler actions. The single contact system is used, so arranged as to be durable and always reliable. The coupler action contacts clean themselves automatically, and all trouble is thereby prevented.

The batteries will have four cells of two volts each, with normal discharge of 50 amperes for eight hours. There will be a motor generator of 220 volts, direct current, to a capacity of 10 volts and 40 amperes, to supply storage batteries without charging through lamps, so that there will be no loss of current from that source. The motor generator is to be so arranged that the Organ can be played for a period of six months or more

continuously without any difficulty or hitching of any description. An ample amount of amperes will always be supplied, and 8 volts at the lowest and 8½ at the highest will always be kept up. By this arrangement the Organ can be performed on continuously, which cannot be done on any Organ hitherto constructed.



MACHINE SHOP.

The switch-board will have a volt and ammeter to show the voltage and strength of the batteries at all times. The ammeter will show the amount of the current being used. There will also be a polarity indicator, to show whether the polarity is right; also a pilot lamp which will indicate, to

a certain extent, the strength of the batteries. There will also be a volt and ammeter on the switch-board, one showing the voltage charging the batteries, and the other showing the amount of the current going into the batteries. Switches will be provided for throwing the generator on and off, and for throwing the current off the Organ when not in use.

There are 1616 automatic combination knobs for setting combinations throughout the Organ.

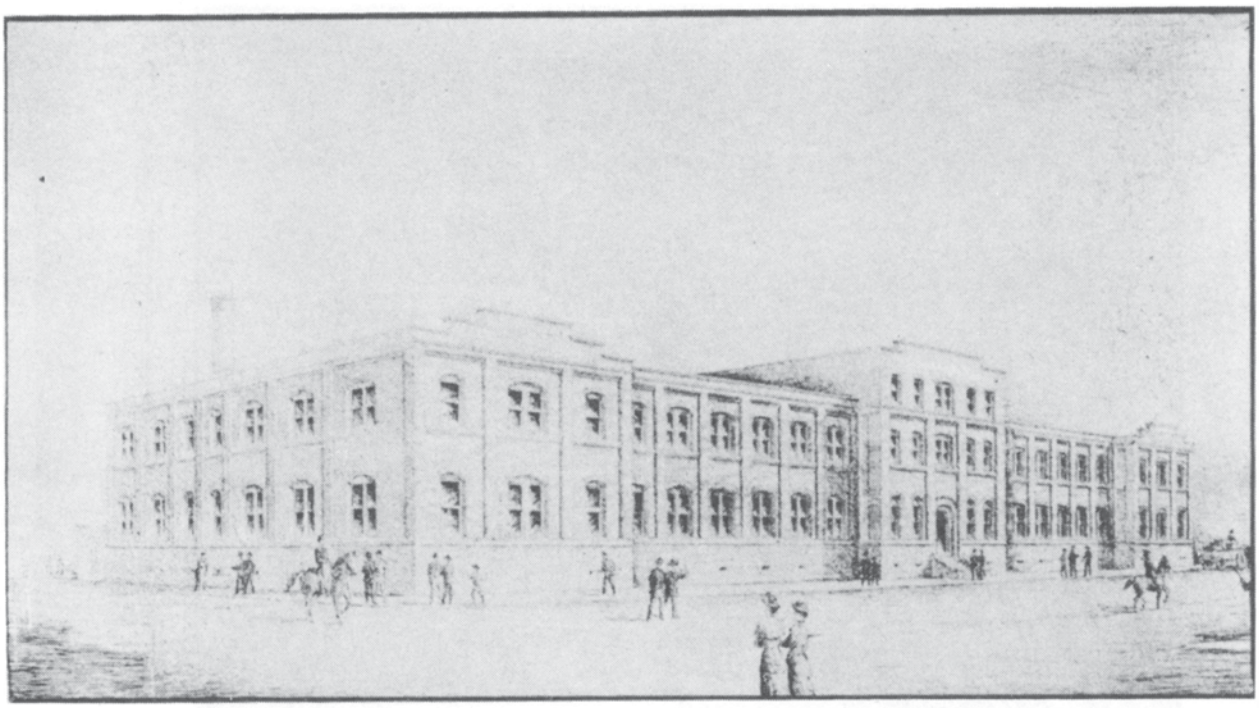
The metal pipes contain 16,000 pounds of zinc and 9000 pounds of soft metal. The wood pipes are of California Sugar Pine, and contain 35,000 feet of that material.

The building frame is constructed of 3 x 12 inch Oregon Pine, all vertical grain, and contains 7000 feet of lumber.

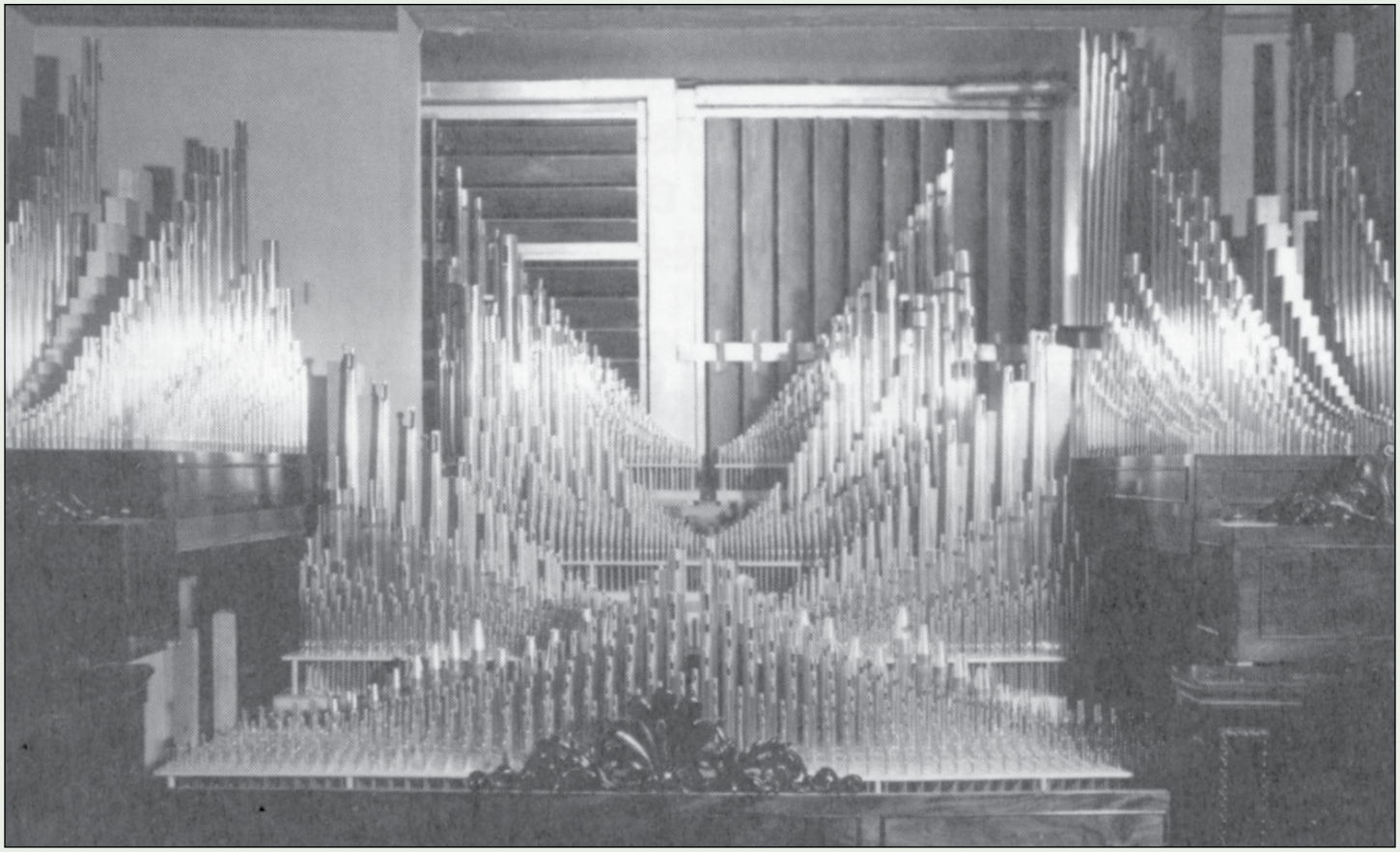
The entire instrument is built under the personal supervision of Mr. W. B. Fleming, the inventor of the system which bears his name.

It will take a dozen large furniture cars (250,000 pounds) to transport the Organ from Los Angeles to St. Louis.

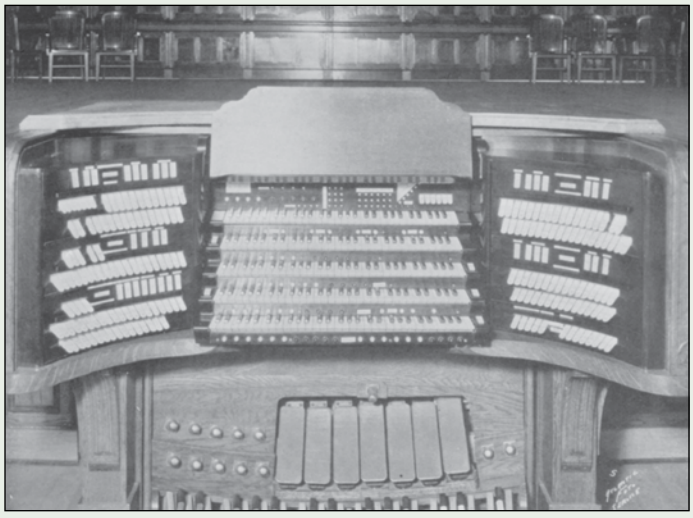
32



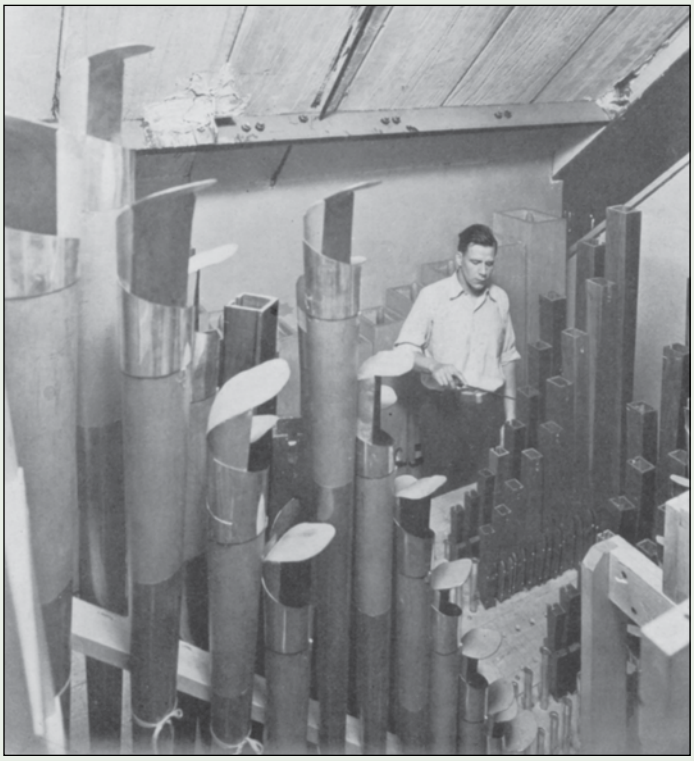
FACTORY — LOS ANGELES ART ORGAN CO. 1515 E. SEVENTH STREET.



Emerson Richard's first of two Aeolian-Skinner house organs: No. 1047, 1944; 107 stops, 139 ranks. Sold 1948, new organ No. 1269, 1955; 85 stops, 124 ranks, destroyed by fire 1958.



The console of the Atlantic City High School Midmer-Losh organ, ca. 1928. **CREDIT**: *Under the Sassafrass Tree, Midmer-Losh,* 1st ed.



RIGHT: Tuner in the Fanfare Organ, tuning the reedless, wood *Gamba Tuba*. In the foreground is the *Tromba*, with Midmer's unique cobra hood "amplifier" resonators, intended to project the sound for maximum volume.

STONELEIGH ESTATE

PHOTO: Joseph Routon

ORGAN HISTORICAL SOCIETY HEADQUARTERS

Stoneleigh Estate
Villanova, Pennsylvania

AEOLIAN-SKINNER, ORGAN NO. 878, 1931

Relocated and Restored by Emory Brothers, 2016

Contract: Aeolian Organ Co.
October 13, 1931
No. 1790, 1931
Original owner: Charles Nichols, West Orange, New Jersey
Built: Aeolian-Skinner Organ Co.
No. 878, 1932
Concertola added: 1935
Echo contracted: July 7, 1937
Restored and installed in Stoneleigh residence by Emery Bros., 2016

Tonal revisions to the original design, noted below, were made by G. Donald Harrison during construction–memo Jan. 25, 1933. Other changes were made during installation.

All ranks 73 notes unless stated; at Stoneleigh, the main organ is installed in new basement chambers, tonal egress is through floor grills into the Great Room.

SOURCE: Rollin Smith, *Organ Historical Society at Stoneleigh Aeolian-Skinner No. 878*; OHS Press, 2019, *Skinner Engineering Dept. Files, with appreciation to Allen Kinzey.*

Appreciation: Allen Kinzey, Bynum Petty, Rollin Smith.

PITCH	STOP	NOTES
II. GREAT		
8′	First Diapason	Added during construction, new from c13; scale 40, ⅔ mouth width
8′	Second Diapason	Former *1st Diapason* pipes; sc. 42, ⅔ mouth
8′	Flute F	*Flute Harmonique*, replaced *Gross Flute;* sc. 50, ⅔; repurposed set from University of Minnesota Northrup Auditorium (No. 892, 1932)
8′	String F	*Gamba;* sc. 56, ⅔ mouth
8′	Flute P	1-12 std. wood, 13-36 open wood *Great Flute*, 37-73 harmonic metal *Melodia*; ⅔ mouth
8′	String P	*Dulciana Celeste;* sc. 56, ⅔ mouth, tuned sharp
4′	Octave	Sc. 47, ⅔ mouth
4′	Harmonic Flute	Sc. 70, ⅓ mouth; harmonic from c25
2′	Piccolo	61 pipes, harmonic from c13, ⅓ mouth width
8′	Trumpet	Harmonic from $f^{\sharp}43$
8′	Clarinet	Contract specified Aeolian free reed, standard Skinner reed installed instead
	Tremolo	
[4′]	Chimes	Deagan Class A, a-e^2 20 tubes, Aeolian action with dampers, unenclosed
8′	Harp	From Celesta, @ c13
4′	Celesta	61 bars, unenclosed
III. SWELL		
16′	Flute	*Bourdon/Spanish Flute;* Aeolian made, sc. 24, 61 wood, 36 metal pipes
8′	Diapason	Sc. 46, ¼ mouth
8′	Spanish Flute	Extension; more typically titled *Flute Español*
8′	String F	*Salicional;* sc. 60
8′	Vibrato String F	*Vox Celeste*; sc. 60, ⅓ mouth
8′	String PP	*Flauto Dolce;* ⅓ mouth, 2:3 taper
8′	Vibrato String PP	*Flute Celeste;* 61 pipes, from c13
4′	Flute	Flute extension
2′	Flageolet	Flute extension
V	Mixture	305 pipes, 61 notes
8′	Cornopean	Harmonic from $f^{\sharp 2}$
8′	Oboe	Skinner style; capped c^3-g^3, then open metal flues
8′	Vox Humana	Skinner Organ Co., not original; spotted metal, soldered lifting lid; open metal flues from $g^{\sharp 3}$
	Tremolo	
	Chimes	Great
8′	Harp	Great
4′	Celesta	Great
I. CHOIR *(Duplexed from Great)*		
SOLO *(playable from Great and Choir)*		
8′	Flute F	*Philomela;* 1-12 std. wood, 13-24 open wood, metal harmonic treble. Originally to have been *Orchestral Flute.*
8′	String F	*Gamba;* sc. 56, ⅛ mouth
8′	Vibrato String F	*Gamba Celeste;* not original, from Aeolian No. 1649
8′	Tuba	Harmonic from $f^{\sharp 2}$
8′	French Horn	Skinner Organ Co., not original
	Tremolo	
ECHO *(1937, playable from Swell and Choir; installed under main staircase)*		
8′	Diapason	Sc. 47, ¼ mouth
8	Flute	*Gedeckt;* sc. 40, wood, metal from g^2
8′	String	*Salicional;* sc. 64, ⅓ mouth
8′	Vox Humana	Soldered cap, two holes on side regulated by tuning slide
	Tremolo	
PEDAL		
32′	Resultant	1-12 *Flute F* 16′ + 10⅔′, sounds 32′ from c13
16′	Diapason	1-12 original, 13-24 new, 25-32 from *First Diapason.* In its original home this stop was extended from the Swell *Diapason.*

STONELEIGH ESTATE

16′	Violone	Wood, not original, from Aeolian No. 1649; unenclosed
16′	Flute F	*Bourdon,* 1-24 Aeolian, 25-44 A-S; unenclosed
16′	Flute P	Swell
8′	Flute F	Extension *Flute F*
8′	Flute P	Swell
	Chimes	Great

COUPLERS

Great, Swell, Choir: 16, 4, Unison Release
Swell to Great 16, 8, 4
Choir to Great 16, 8, 4
Solo to Great
Swell to Choir 16, 8, 4
Solo to Choir
Echo and Choir
Echo Only (Choir)
Echo and Swell
Echo Only (Swell)
Great, Swell to Pedal 8, 4
Choir to Pedal

CONSOLE CONTROLS

0-5	Great, Swell, Choir divisionals
0-4	Solo, Pedal divisionals
0-4	Generals
	All Off
	Combination Set with key lock

Great to Pedal Reversible: toe and piston
Swell to Pedal Reversible: toe and piston
All Swells to Swell Reversible: toe and piston
Sforzando Reversible: toe and piston
Crescendo Pedal
Great-Choir Expression
Swell Expression
Solo Expression

Harp and Celesta P and F
Harp and Celesta Dampers on/off
Chimes P and F

DUO-ART Player (entirely automatic)
SOLO Player (semi-automatic)
Tempo, Reroll, Reroll and Repeat

CONCERTOLA (1935, fully automatic, loads 10 rolls)
1-10 Music Selection pistons
Reroll, Repeat, Progr'm, Organ Start, Organ Stop

Wind pressures: Great, Swell: 6″ (153 mm); Solo 10″ (253 mm); Echo 3¾″ (95 mm); Pedal 5″ (125 mm)

Compass: 61/32 notes
Pitch: A440, Equal temperament
Console: Vertical stop tablets in horizontal rows, side jambs, with roll top
Blower: Spencer Orgo-Blo

Swell Mixture V

C	4	2	1⅓	1	⅘
$A^{\sharp}$	8	4	2⅔	2	1⅗
$c^{\sharp 3}$	8	4	3⅕	2⅔	2

ESSAY BY SCOT HUNTINGTON

AEOLIAN ORGAN COMPANY NO. 1790 WOULD PROVE TO BE THAT company's last residence organ. The patron was Charles Walter Nichols (1875–1963). A chemical engineer, he was associated with his father William's company which after numerous mergers and acquisitions became known as Allied Chemical and Dye. We knew this corporate giant as the Allied Chemical Company (1958), which became Allied-Signal Corporation in 1985, and then merged with Honeywell in 1999–the company assuming the latter name. Nichols grew up in households resplendent with organs–the first was a large 35-stop George Jardine & Son (1881), and the second was a 4-33 Aeolian No. 1985 (1908, enlarged 1921). Charles commissioned No. 1790 for his sprawling West Orange, N.J. gentleman's estate then under construction, PLEASANTDALE FARM, a luxurious Norman-style mansion boasting 22 rooms.

When the contract was signed on October 13, 1931, negotiations were already under way for the acquisition of Aeolian's Organ Division by the Skinner Organ Company. The Nichols contract was for $25,474, but Aeolian shaved off $700 and increased the number of included rolls from five to ten, to hasten the deal. Nichols would have been advised by Aeolian general manager Frank Taft that the instrument would be built and installed by the newly merged corporation. Indeed, less than two months later, the merger was publicly announced on December 11, 1931. Aeolian only signed two more contracts following that announcement. All outstanding Aeolian orders were completed and installed by the Aeolian-Skinner company. In point of fact, the Aeolian employees were dispersed and only two were rehired by the new company (former President William Alfring and Frank Taft). Two employees left out in the cold, but not for long, were Richard Whitelegg and Adolf Zajic, both soon to begin pursuing careers of distinction at M.P. Möller in short order. Jack-of-all-companies Robert Pier Elliot had already departed Garwood for the security of Kimball's Chicago factory. The Skinner company both managed to acquire $50,000 in liquid assets (nearly one million dollars in today's currency), and dispatch one of their biggest rivals in one move. The Aeolian Piano Division then merged with rival Ampico to become the Aeolian-American Corporation (East Rochester, N.Y.). The piano

employees fared no better as Ampico soon moved all manufacturing to Rochester and closed the Garwood factory. Investor Arthur Hudson Marks was named president of the new Aeolian-Skinner company, and its namesake founder, Ernest Skinner, was demoted to a mere figurehead as one of three vice presidents.

Aeolian-Skinner immediately discontinued production of the former Skinner Organ Co. roll technology in favor of the Aeolian rolls and catalog–the real plum of the merger. The new company continued their job numbers where the Skinner Organ Co. numbering had left off, and the Nichols contract was the fourth of five taken over and completed in the Dorchester works (Nos. 874–879). G. Donald Harrison assumed control of the company's voicing, and made a few changes to the original design. The contract stipulated the company would maintain the instrument at two month intervals(!) in perpetuity, which continued until they closed their New York service department following the retirement of its chief tuner (July 1963). Apparently, the company was not aware that Mr. Nichols had died the previous April, which is surprising given the bi-monthly tuning schedule.

The estate was acquired by the Allied company which used it as a corporate retreat, and the chamber doors were essentially locked and walked away from until 1994 when the property was sold to a developer. Curt Mangel, curator of the Wanamaker Organ, acquired the organ and put it into storage. The organ was eventually sold to Fred Cramer of Pittsburgh who over the fullness of time undertook a partial restoration of its mechanics. Upon his recent retirement, he again placed the organ up for sale.

Fortuitously, the Haas family and the Organ Historical Society were concurrently negotiating for the organization's occupancy of the family's historic Villanova estate STONELEIGH. Frederick Haas, family scion, patron of the arts, and organist, recognized the opportunity to install a significant instrument in the family home–the realization of a life-long dream. The Nichols instrument was acquired in due course and restored by the Emery Brothers (Allentown, Pa.), under the direction of Adam Dieffenbach, a fifth-generation descendant of Pennsylvania's first multi-generational organbuilding dynasty.

Installation of the instrument in the mansion's cellar proved an unexpectedly massive undertaking. With a ceiling height of only eight feet, it was necessary to excavate a deeper chamber. It was soon discovered the house was built on schist bedrock–jack-hammering through layers of stone and manhandling it out by the cart full was an exhaustively grueling effort for the workmen responsible.

In its original West Orange installation, the organ was installed in the basement, hampered by spectacularly inadequate tonal egress through winding tunnels, narrow metal ducting, and postage-stamp-size grills. In its present location, the organ enjoys near-ideal residential placement–spacious chambers with generous service access speaking into an acoustically-favorable blending chamber with line-of-site egress through generous bronze floor grills into the Great Room. A roomy pantry closet off the kitchen which extended under the grand staircase was surrendered to become the Echo chamber, now speaking directly into the stair hall through artfully-camouflaged woodwork. A vast library of Aeolian rolls was acquired from Curt Mangel (one of the finest collections in private hands), the Duo-Art mechanism was restored by Chris Kehoe, and the Concertola machine is under restoration by Kegg Pipe Organ Builders of Hartville, Ohio.

A particularly subdued 1940s wartime Christmas display in the Grand Court, devoid of pre-War exuberance, with the prominent Service Star banner having a resonance with every American household. A blue star signified a service member was serving in the military, and in this case the number in the center marked the number of store employees then in service. When a gold star was placed above the blue, it signified a family member had died in action. This banner no doubt, would have been a permanent fixture during the war years.

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Medium-Large Consoles
Dual Card Strings
10 Analog Inputs
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- Extremely Customizable
- New Predictive Combination Action
  - -100,000 levels, divided into folders
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  - -Multiple chambers supported per link
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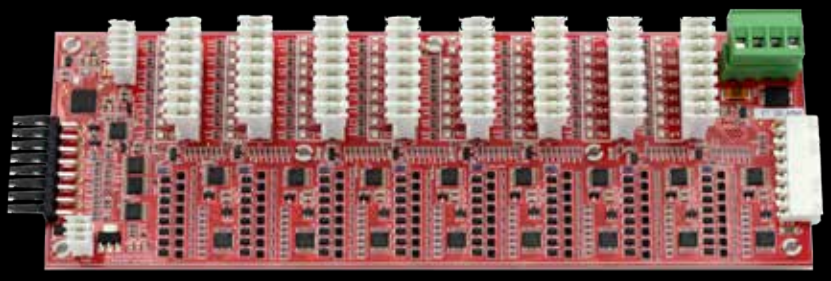
  - -Load into console, updates everywhere
- High Precision Analog Inputs
  - -Calibrate to any configuration

CVE Controller
Small-Medium Consoles
Single Card String
4 Analog Inputs
Single PipeBus Port



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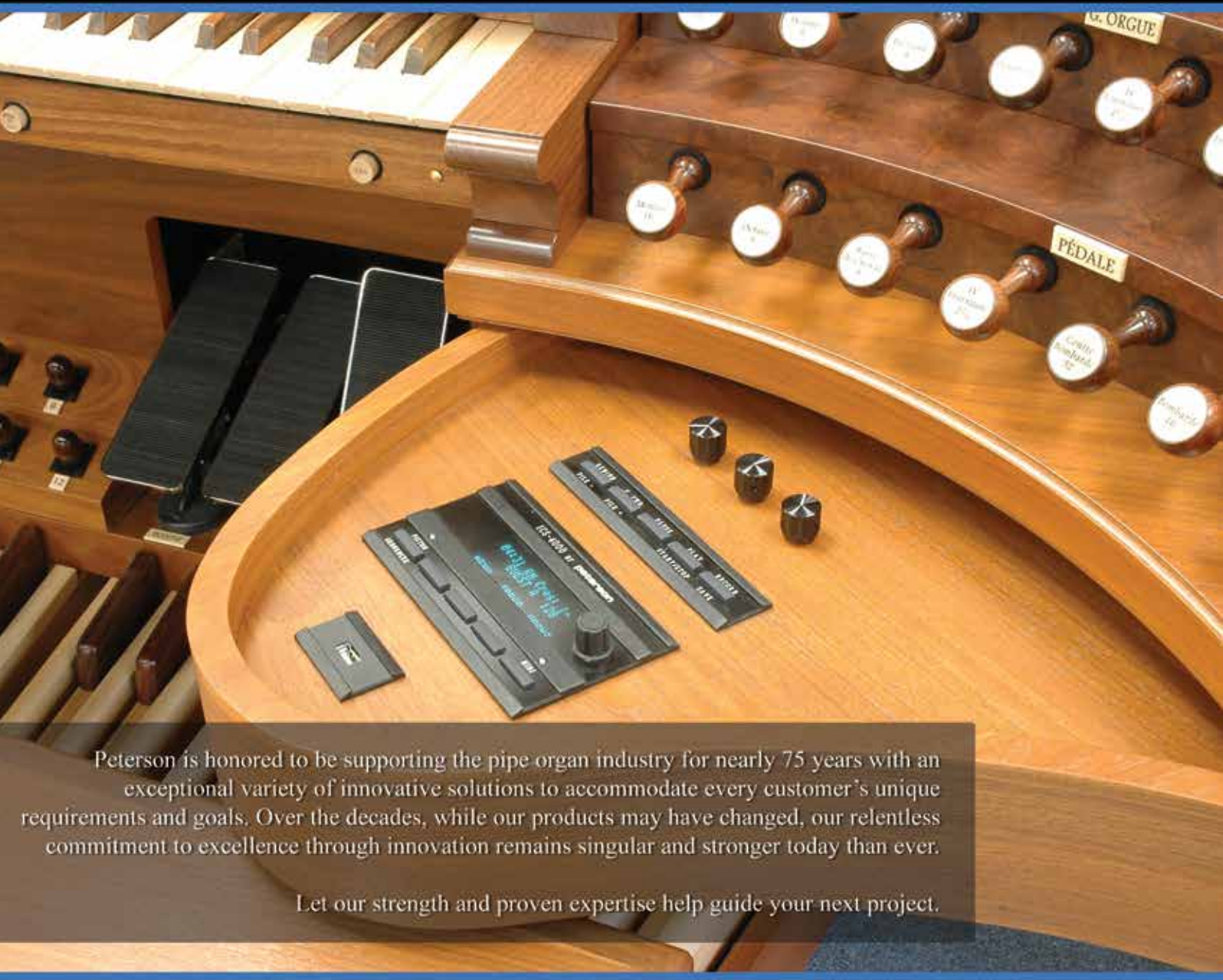

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