COMMENT ON NATIONAL REGISTER NOMINATION

ADDRESS: 2100 Arch Street, BIOSIS Headquarters Building

OVERVIEW: The Pennsylvania Historical & Museum Commission (PHMC) has requested comments from the Philadelphia Historical Commission on the National Register nomination of 2100 Arch Street located in the Center City neighborhood of Philadelphia and historically known as the BIOSIS Headquarters Building. PHMC is charged with implementing federal historic preservation regulations in the Commonwealth of Pennsylvania, including overseeing the National Register of Historic Places in the state. PHMC reviews all such nominations before forwarding them to the National Park Service for action. As part of the process, PHMC must solicit comments on every National Register nomination from the appropriate local government. The Philadelphia Historical Commission speaks on behalf of the City of Philadelphia in historic preservation matters including the review of National Register nominations. Under federal regulation, the local government not only must provide comments, but must also provide a forum for public comment on nominations. Such a forum is provided during the Philadelphia Historical Commission's meetings.

The BIOSIS Headquarters Building is nationally significant under Criterion A in the area of Communications for its association with BIOSIS, the largest database publisher for the life sciences. The non-profit organization, also known as Biological Abstracts, founded in 1926, spearheaded the abstracting and indexing of millions of scholarly articles focused on life sciences and biology in the United States following World War I when German databases, which researchers and scientists had historically relied on, became inaccessible. While seemingly benign, the process of abstracting and providing indexed abstracts was critical to the scientific community, as it enabled a free flow of information amongst institutions and researchers. The non-profit initially operated out of the University of Pennsylvania Zoology Department Building from 1926 to 1946 and later out of converted row houses in West Philadelphia from 1946 to 1966. The building at 2100 Arch Street was the first purpose-built location for the company, and it represents the physical manifestation of the success and importance of BIOSIS to the study and advancement of the life sciences in the mid twentieth century. The building is exceptionally significant as the location of BIOSIS's most important period of advancement into the digital age (from 1966 to 1999). During the period of significance, BIOSIS was "the world's largest life science abstracting, indexing, and access service," meeting Criterion Consideration G. During the company's time at 2100 Arch Street, it developed new products that advanced the dissemination of scientific information. This property is not listed on the Philadelphia Register of Historic Places.

OMB Control No. 1024-0018
expiration date 03/31/2026

0United States Department of the Interior **DRAFT**
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: __The BIOSIS Headquarters Building_____

Other names/site number: Biological Abstracts Building, William Henry Maule Company Building Name of related multiple property listing**:**

N/A_____

(Enter "N/A" if property is not part of a multiple property listing

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2. Location

Street & number: _2100 Arch Street_____

City or town: _Philadelphia_____ State: __PA_____ County: ___19103_____

Not For Publication: ☐ Vicinity: ☐

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3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this _x__ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property __x_ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___national _x__statewide ___local

Applicable National Register Criteria:

__x_A ___B ___C ___D

_____ **Signature of certifying official/Title:** **Date** _____ **State or Federal agency/bureau or Tribal Government**
In my opinion, the property ___ meets ___ does not meet the National Register criteria. _____ **Signature of commenting official:** **Date** _____

Title :	**State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

_____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	X
Public – Local	
Public – State	
Public – Federal	

Category of Property

(Check only **one** box.)

Building(s)	X
District	
Site	
Structure	

Object ☐

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
1		buildings
		sites
		structures
		objects
1	0	Total

Number of contributing resources previously listed in the National Register N/A

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6. Function or Use
Historic Functions
(Enter categories from instructions.)
COMMERCE/TRADE: Business

Current Functions
(Enter categories from instructions.)
VACANT/NOT IN USE

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7. Description

Architectural Classification
(Enter categories from instructions.)
LATE 19TH & 20TH CENTURY REVIVALS/Classical Revival
MODERN MOVEMENT/Late Modern

Materials: (enter categories from instructions.)
Principal exterior materials of the property: _Concrete, Brick, Glass_____

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The BIOSIS Headquarters Building is an eight-story office building located at 2100 Arch Street in Center City Philadelphia. The building is comprised of two fully integrated eight story sections with flat roofs. The east section was originally completed in 1913 and adapted for use by BIOSIS between 1966 and 1982; the west section was completed in 1982 at the peak of the company's growth. The building is a strong example of a 1980s era adaptive reuse project that utilizes the prevailing concept of designing a contemporary addition to facilitate continued use of the original, previously outdated building. The 1913 portion of the building features a poured concrete frame with a brick veneer. The brick on the 1913 portion of the building is laid in a common bond on the lower seven stories and Flemish bond on the eighth story. The building has a traditional early-twentieth century revival-style appearance with vertical brick piers intermixed with window bays. Upon purchase by BIOSIS in 1966, the exterior was modernized as their headquarters building with the insertion of brutalist concrete window surrounds at the first floor, simplified stripped cornice band at the roof and single-light windows throughout. During its early years of ownership, the west elevation was fully exposed to an adjacent surface parking lot that was owned by BIOSIS. In 1982, BIOSIS constructed the west section on the surface parking lot, in order to meet the spatial needs of the company. This addition was counter to much of what was happening at the time in Philadelphia, as it eliminated the company's own parking lot, and replaced it with an eight-story office addition, without on-site parking. The 1982 section is constructed out of poured concrete with an aluminum frame curtain wall system and was designed by the firm of Wallace, McHarg, Roberts, and Todd, now called WRT. Important character-defining features from the 1982 expansion include its Art Deco-inspired security grilles within the first-story window bays of the east section; dark, fixed, single-light glazing in all window openings; a flat concrete cornice band that replaced a more decorative terra cotta cornice; the prominent angled aluminum-frame curtain wall addition that creates an entrance courtyard; and the matching single red brick and concrete detailed bay that bookends the curtain wall section at the west end of the building. The design is unique as it fully integrates the curtain wall section into the earlier brick section, creating a harmonious design without recladding or eliminating the original appearance. A landscaped area fronting the north elevation of the 1982 section provides a welcoming and grand entrance. This design represents the public face for BIOSIS.

The interior of the building represents the specific design intent of a headquarters office building dating to 1982. Primary entrance is provided through the two-story entrance atrium, which welcomed employees and visitors to the building. An open stair provides access to the basement which was utilized as an auditorium and gathering space. Beyond this entry area, spaces are

representative of offices dating to the period of significance (1966-1999) with gypsum board walls, ACT ceilings, tile and carpet flooring and exposed curtain wall cladding. The 1913 section retains elements of its earlier construction date, including a wood-paneled entry accessible from 21st Street. Executive offices on the eighth floor include fireplaces and built-in cabinetry. The building retains integrity as a primary example of a Late Modern adaptive reuse project developed to enable the continued growth of BIOSIS during the mid-to-late twentieth century.

Narrative Description

SETTING

The BIOSIS Headquarters Building at 2100 Arch Street is located on the western end of Center City Philadelphia, Pennsylvania, situated among low- to high-rise buildings near the Schuylkill River (Map 1). Located to the west of the subject building on the same block is the five-story brick Science Leadership Academy building, separated from BIOSIS by a three-story brick annex. To the east across 21st Street is a two-story Midcentury Modern office building at 2042-2048 Arch Street. A parking lot that primarily serves the surrounding buildings is located directly south of the subject building, on the opposite side of Walden Street and abutting the regional railroad line. Across Arch Street to the north is 2113 Arch Street, part of a late-twentieth century residential development. Logan Square, a central landmark in Philadelphia, is located about a half-mile to the northeast. The site is located about one mile from the Philadelphia City Hall to the east and a half-mile from the Schuylkill River to the west.

SITE

The nominated building occupies a third of its block with three street-facing elevations (Map 4). The building fronts Arch Street to the north, 21st Street to the east, and Walden Street to the south. The building is constructed along the property lines on all four sides.

Map 1: Locational Map showing the Biosis Headquarters Building in Philadelphia. Note the Schuylkill River to the west, and downtown Center City to the east. (Base Map Source: Google)

Sidewalks (outside the nominated boundary) border the three streetside elevations, separating the building from the street. A recessed courtyard with plantings is located on Arch Street (Photos 2 & 3), leading to the main entrance on the 1982 section. Concrete steps lead directly to the primary entrance, while a concrete ramp borders the north elevation of the addition. This landscaped area functions as the public face of BIOSIS and is intentionally located within a recessed portion of the 1982 curtain wall, a grand entrance to a “modern” scientific company. Although a character-defining space, this landscaped courtyard is not counted as a separate resource due to its size.

Map 2: Site Map showing the construction dates of the original 1913 building and then 1982 Addition. (Base Map Source: Google)

EXTERIOR (MAP 4)

Photo 1*:* Exterior, North Elevation, view looking southeast.

The BIOSIS building (Photo 1) contains three distinct exterior sections: the original 1913 eastern section (Photos 5 to 9), the 1982 glass curtain wall middle section (Photo 2), and the 1982 brick west section (Photos 1 & 10) that bookends the building. As stated on a rendering of the building, "the intention was to show the growth architecturally by having it appear that the west wall of the original building, composed of solid masonry, had been pushed 80 feet westward, enabling the company to 'stretch out' as if a giant drawer had been opened" (Figure 1). The 1913 and 1982 sections of the building feature flat roofs, each with a synthetic membrane, separated by a parapet.

Photo 2: Exterior, North Elevation, view looking south.

The original 1913 portion of the building features the typical office building design with base (first story), shaft (stories two to seven), and capital (the eighth story). Common bond brick clads the first seven stories of the building, with bricks laid in Flemish bond cladding the eighth story. Tripartite concrete framed windows with circa 1982 decorative Art Deco-inspired operable iron

grilles pierce the first story, and an angled concrete beltcourse separates the first and second stories.

The upper story window openings have concrete sills. A brick and concrete beltcourse separates the seventh and eighth stories, and a simplified cornice of brick and concrete lines the upper wall. The eighth floor contains rounded brick arched windows with a concrete keystone. The rear (south) elevation contains a loading dock, which features brick-enclosed bays, an exposed concrete structural column, and a brick water table. All window openings have dark, fixed, single-light glazing that ties this section in with the 1982 curtain wall. The first floor also features elements that date to the BIOSIS period and likely were installed in the late 1960s when the building was first purchased. These features include the brutalist-style concrete window surrounds which were originally added to signify that the was the BIOSIS building. These elements are similar to those found on mid-century science buildings located on the University of Pennsylvania campus in West Philadelphia, which was the home of the company between 1926 and 1966.

The 1982 section is mostly comprised of a black aluminum-frame curtain wall with black spandrel panels concealing the concrete floor plate (Photo 2). The central section incorporates the west elevation of the 1913 section into the curtain wall design creating a recessed, three-sided façade that angles back towards Arch Street at the western end (Photos 1 & 2). The curtain wall terminates into the west end of the addition that has been designed in kind to bookend and match the materials and fenestration of the original 1913 portion of the building. This one-bay-wide section is constructed out of a running bond brick veneer, and features similar concrete string courses, cornices, and sills. The rear (south) elevation of the addition contains a recessed first floor for loading, which is clad in vertical composite paneling.

NORTH ELEVATION: (Photos 1 to 5) The primary elevation faces north onto Arch Street and is comprised of three sections: the 1913 east section (Photo 5), the 1982 central curtain wall section, and the 1982 brick book-end west section (Photo 2). Four bays generally organize the 1913 section. On the first story, brutalist-style mid-century concrete casing divides the end bays into tripartite windows and the inner two bays into pairs. Decorative operable metal security grilles installed circa 1982 protect the glazing in the windows (Photo 3).

Photo 3*:* Exterior, North Elevation, view looking south.

Below the windows is a band of concrete that continues around the building. An angled concrete beltcourse divides the first and second stories. The next identical six stories (two to seven) contain fixed one-light windows with concrete sills. The central two bays contain paired units, and the outer bays contain single units centered on the tripartite windows of the first story. A decorative beltcourse constructed out of brick and concrete caps the seventh story and continues around the 1913 portion of the building. The eighth story is similar to the six stories below; however, the windows are topped with brick arches containing a concrete keystone. The glazing contains single-light fixed units. Capping the eighth story is a flat concrete cornice band and brick parapet that continues around the 1913 portion of the building and was created as part of the 1982 construction campaign. A decorative brick cornice borders the roof parapet of the 1913 portion of the building.

The 1982 section's north elevation sits back from the 1913 section. An aluminum framed curtain wall replaced the brick exterior of the 1913 building's west elevation to create the recessed eight-story, three-sided glass curtain wall comprising this center portion of the north elevation. The recess provides for an entrance courtyard. The aluminum framed curtain wall contains dark spandrel panels at each floor level. The primary entrance to the BIOSIS building is located on the angled façade of the curtain wall and is characterized by double-leaf glazed commercial

doors capped with a transom containing signage for the building. Concrete steps and a ramp lead up to the primary entrance and frame planters (Photo 4).

Photo 4*:* Exterior, North Elevation, view looking southwest.

Photo 5*:* Exterior, North Elevation, view looking south.

The west end bay contains the brick portion of the 1982 section, designed as a simplified version of the 1913 building. A decorative operable metal window grille covers the single window on the first story. The six stories above are identical and contain one single-light glazed window with a concrete sill. The eighth floor, similar to the 1913 portion of the building, contains two rounded brick arched windows with keystones. This bay mimics the concrete string courses, cornice brick parapet of the 1913 portion of the building, bookending the curtain wall section to create a single, architectural composition. This composition embraces the traditional Philadelphia red brick, intermixed with the modern black curtain wall portion.

EAST ELEVATION (Photos 6 to 8): The east elevation fronts 21st Street and is seven bays wide. The elevation only consists of the 1913 portion of the building (Photo 6). The center bay contains a recessed secondary entrance consisting of a double-leaf metal commercial door capped by a wood frame fanlight. A decorative brick arch with concrete end caps and a concrete keystone frames the fanlight (Photo 7). Concrete steps lead up to the secondary entrance.

Photo 6: Exterior, East and North Elevations, view looking southwest.

Photo 7*:* Exterior, East Elevation, view looking southwest.

The flanking five bays contain a continuation of the windows on the north elevation tripartite windows surrounded by brutalist-style concrete casing, metal security grilles and the angled concrete beltcourse. The southern-most bay contains a recessed loading dock. A brick column with a granite base supports the corner of the building. The loading dock (Photo 8) contains a metal double-leaf commercial door. Evidence of other windows and secondary entrances is noticeable within the loading bay, though these elements have been infilled with brick. Below the bays of the east elevation is a band of concrete and granite blocks. The next six stories are identical and contain either paired or single one-light fixed window units with concrete sills. The eighth floor contains arched window units and is capped by a flat concrete cornice band and brick parapet.

Photo 8: Exterior, Southeast Corner, view looking southwest.

SOUTH ELEVATION (Photos 9 & 10): The south elevation fronts Walden Street and is the building's rear elevation. Like the north elevation, this elevation is separated into three sections: the east 1913 section, the central 1982 glass curtain wall addition, and the western 1982 brick bookend bay. The 1913 section is four bays wide (Photo 9). The ground story contains basement access, with a secondary entrance in the center of the elevation. The entrance consists of a commercial metal door with a center light. West of the entrance corresponds to an internal fire escape which consists of a commercial metal door. The eastern two bays consist of a brick-infilled bay and the aforementioned loading dock. The first story contains two paired window bays containing one-light fixed units with concrete sills. The east bay contains the loading dock, and brick fills the west bay opening. The next identical six stories contain two paired window bays in the center flanked by single-unit window bays. An enclosed bay is located on the west side of the elevation. The eighth floor contains paired arched windows in every bay.

Photo 9: Exterior, South Elevation, view looking northwest.

Photo 10: Exterior, South Elevation, view looking northeast.

The 1982 section consists of two sections: the glass curtain wall and the bookend brick bay (Photo 10). The curtain wall section contains a double-height recessed portion at ground level that acts as a loading dock. The loading section is clad in vertical composite siding. Two structural columns support the loading dock. A ribbon storefront window is located on the first-floor level of the loading dock, and multiple entrances consisting of metal commercial doors are located on the ground level. The upper stories consist of the aluminum-frame curtain wall with dark spandrel panels at each floor level. The west bay contains the brick portion of the addition. The ground level and first story are unadorned. The upper stories are identical to the north

elevation. The western end bay serves as a bookend with the one-bay-wide red brick section with concrete string courses, cornices, and sills to match the 1913 section.

WEST ELEVATION: The west elevation abuts the Science Leadership Academy on the first three stories. The rest of the elevation is unadorned, except for the string courses and cornice that continue around the elevations of the addition.

INTERIOR (Photos 11 to 21)

The building at 2100 Arch Street is currently vacant. The first floor contains the building's main entry atrium and flanking office space while the upper floors contain the various offices. After BIOSIS's acquisition of the property in 1966, the 1913 building was renovated to suit the needs of the company. With the 1980s addition, the 1913 portion of the building was updated with mid-twentieth century finishes which are still the predominant character of the interior. While BIOSIS sold the building in the mid-1990s, it retains the essential interior appearance of the BIOSIS headquarters.

VERTICAL ACCESS: Vertical access throughout the building is provided by a central access core that includes a bank of two elevators and two stairs, located within the 1982 curtain wall section (see Photos 8 and 9 for examples). A switchback stair to the west of the elevators leads from the first floor to the basement. The egress stair to the south of the elevators, is constructed of concrete with metal tube railings and are utilitarian in character.

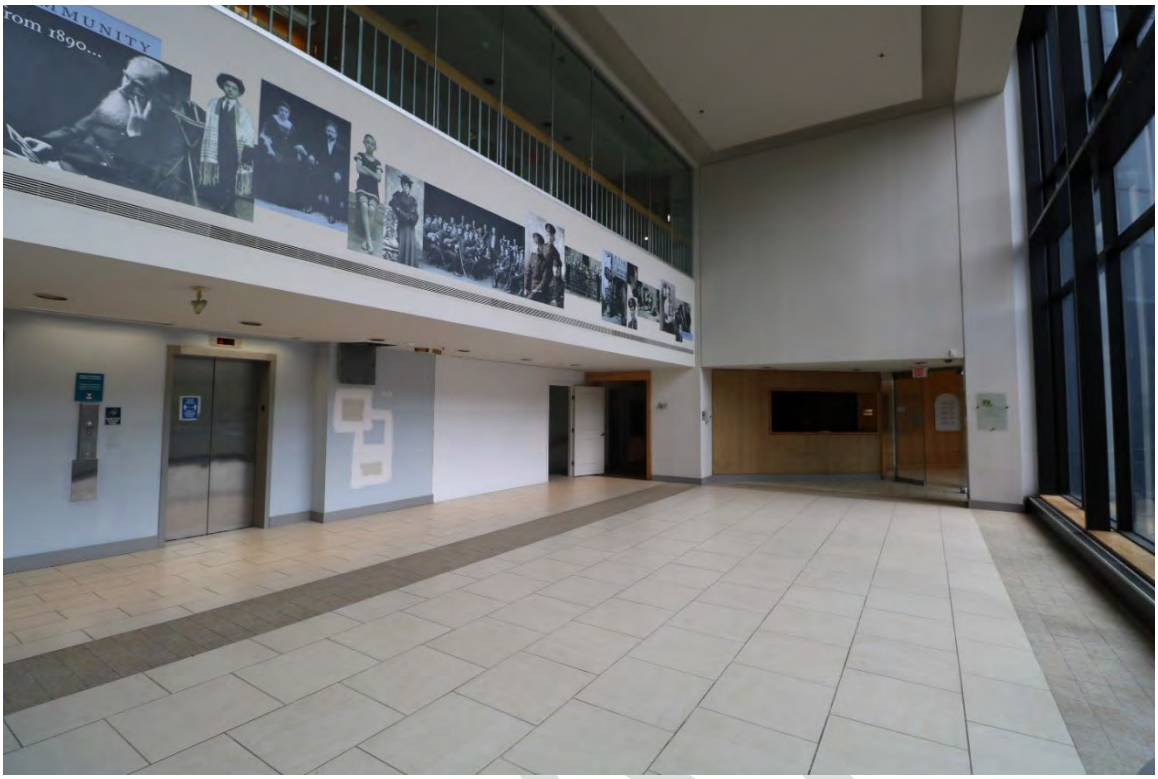

Photo 11: Interior, First Floor, Lobby, view looking southeast.

Photo 12: Interior, First Floor, Stairwell, view looking west.

The 1913 section retains the original east stairwell that provides access from the first floor to the eighth floor (Photo 12). The first-floor section of the stair retains white marble treads, risers, and wood half-wall paneling and a cast-iron balustrade (Map 6). On the second floor, the historic finishes are simplified and there is a simple metal railing system which continues up to the eighth floor (Map 7). Abutting the east stair to the south is a historic elevator shaft. At each landing, an elevator opening is located at the south wall of the stair. A historic freight elevator is located at the southeast corner of the 1913 section adjacent to the loading dock. There is a 1982 fire stair located at the southwest corner of the 1913 section. Finishes in this stair are utilitarian, with metal treads, simple metal tube railings, concrete floors, and gypsum board walls.

FIRST FLOOR (MAP 5): The main entrance off Arch Street provides access to the first floor of the north portion of the 1982 section. The entrance leads into a main entrance lobby which contains original finishes, including wood paneling, recessed lighting, tile floors, and aluminum-frame interior glazing (Photo 13). To the east of the lobby is a non-historic glass vestibule with a security room window. The vestibule leads to a double-height atrium with a glass-enclosed balcony above (Photo 14). Access to the central elevator bank and open stairs to the basement are located at the southern end of the lobby. A passage to the west leads to the reception and security room behind the vestibule, which contain similar finishes, in addition to Colonial Revival-style casing around some windows to mimic the style of the east section. In the southwest corner, there are administrative offices constructed out of gypsum board with 1960s metal casing around the interior windows.

Photo 13: Interior, First Floor, Vestibule, view looking southwest.

Photo 14: Interior, First Floor, Lobby, view looking west.

Photo 15: Interior, First Floor, view looking northwest.

The east passage leads to the 1913 portion of the building. An open meeting room is located in the north section (Photo 15). The structural columns have been decorated with information from the Jewish Federation of Greater Philadelphia (the last occupant of the building). The southern half of the 1913 section contains additional 1980s-era finishes such as checkerboard linoleum tile floors, gypsum board partition walls, and acoustic tile ceilings. At the center of the east side of the 1913 section is the original entrance vestibule which leads to the east stair and first floor of the building (Photo 9). Many original features are intact such as wood paneling, cast-iron railings, a coffered plaster ceiling, marble flooring and metal-framed stairs.

SECOND FLOOR (MAP 6): The second floor is accessed via the central elevator bank and egress stair in the 1982 section, as well as by the two stairs and elevators in the 1913 section. The central elevator bank leads out onto a hallway that looks over the main entrance atrium (Photo 16). The north wall of the hallway is completely glass, sitting behind a wood and metal railing matching that of the basement stairs.

Photo 16: Second Floor, Elevator Lobby Mezzanine view looking east.

Photo 17: Interior, Second Floor, view looking northwest.

The west passage leads to the former BIOSIS computer room (Photo 17 & Figure 11) which matches the finishes of the remainder of the building but has a slightly lowered floor slab, as it previously had a raised pedestal floor to service the mainframe computers. The east passage from the elevator bank leads into the 1913 portion of the building. Open office areas surround the east circulation core with smaller offices lining the south perimeter wall and the northwest corner of the floor. The finishes in the 1913 portion of the building include late twentieth-century materials like carpeting, gypsum board and vertical paneled walls, metal door and window casings, and suspended acoustic tile ceilings which are consistent with the BIOSIS era (Photo 14).

THIRD TO SEVENTH FLOOR (MAPS 7 AND 8):

The third to seventh floors are organized around a roughly centered elevator lobby on each floor with the historic stair on the east end of the 1913 section of the building. These floors, throughout both sections of the building, were utilized for office space by BIOSIS (Photos 18 & 19).

Photo 18: Interior, Fourth Floor, view looking northeast.

Photo 19: Interior, Sixth Floor, Stairwell, view looking northeast.

Office spaces at all floors have been reconfigured and updated over the years with modern finishes, however, BIOSIS-era finishes and offices are still present throughout (Photo 18). These finishes include carpeted and vinyl tile floors, gypsum board partition walls, wood trim, metal door casings, aluminum-frame windows, and suspended acoustic ceilings.

EIGHTH FLOOR (MAP 9): Executive offices remain on the eighth floor within the 1913 section (Photo 20). These spaces include wood trim around windows, suspended acoustic tile ceilings, a fireplace with a marble surround and glazed tile hearths, and wood baseboard and chair rails which appear to date to the 1966-1968 renovation. Above the acoustic tile ceilings added during BIOSIS' occupation of the building, the arched transoms remain. At the 1983 side of the building, the general layout and finishes are in keeping with those on the floors below.

Photo 20: Interior, Eighth Floor, Executive Office, view looking east.

BASEMENT (MAP 10): The basement is mainly accessed through a large open communicating stair located next to the elevator bank on the first floor of the 1982 addition, which provides direct access from the first floor elevator lobby and atrium (Photo 21).

Photo 21: Interior, Basement, Stairwell, view looking northwest.

Other ways to access the basement include the main elevator bank, freight elevator, and the ground-level doors on the south elevation of the building. The stairwell contains its original finishes, including carpeted treads and risers, wood and metal guardrails, and wood stringers. The basement suffered serious water damage in the past ten years which has removed much of the original finishes, just leaving metal furring throughout. The west end of the basement originally contained an auditorium which now just contains the sloped floor and stage.

In front of the elevator bank are two rooms which contain no notable features. The basement of the 1913 building is accessed through a set of stairs that lead up to a central passage. In the north portion of the basement is the machine room which contains mechanical equipment, including BIOSIS-era utility panels. The southern section of the 1913 building contains various utility rooms. The walls are constructed out of exposed brick.

INTEGRITY

The BIOSIS Headquarters Building at 2100 Arch Street retains historic integrity from its period of significance, 1966 to 1999.

Location and Setting: The BIOSIS building remains in its original location within west Center City, Philadelphia. The development of the BIOSIS Headquarters Building between 1913 and 1982 parallels the development of this area of downtown. The building is situated among low- to

high-rise buildings near the Schuylkill River and alterations to the immediate surrounding vicinity reflect the evolution of the area across the twentieth century. The building retains integrity of setting as a part of the ever-changing landscape of Center City Philadelphia, representing the period of significance which extends from 1966-1999; the height of BIOSIS/Biological Abstracts success.

Design: The BIOSIS building retains historic design integrity by showcasing its eras of construction. The building was completed between 1913 and 1982, beginning with the east section's original construction in 1913, along with its updates of the original building and construction of the west section in 1982 to create the BIOSIS Headquarters Building as it is today. The building, therefore, displays two separate architectural styles applied to commercial/industrial buildings during that timeframe. The east 1913 section was constructed with references to the Classical Revival, with its arched windows at the eighth story and its masonry construction. Elements from the 1960s at the first floor, such as lowered ACT ceilings, mark the building's purchase and conversion by BIOSIS. The 1982 west section was designed with elements of Late Modern style, such as its aluminum glass curtain wall and asymmetrical north elevation, as was typical for commercial buildings in the late twentieth century. The design completed by WRT is a reflection of preservation philosophy at the time, which emphasized compatibility with the original design while differentiating the old from the new. Unlike the original section, the 1982 section has a modern appearance characterized by its glass curtain walls. At the far west, the final bay features a brick tower resembling the 1913 construction, creating a bookend effect. The addition features a reinforced column and beam structure faced primarily with aluminum and glass and with brick and concrete facing the west end of the addition. The distinct contrast between the two sections of the building remains today, representing the building's appearance during the BIOSIS period.

At the interior, renovations completed in 1966 after BIOSIS moved into the 1913 section altered floorplans and finishes. Other tenants and BIOSIS office spaces feature updated finishes as well, as is typical with commercial buildings that have experienced continued use. The overall plan since the BIOSIS' renovations in the mid-twentieth century has remained largely the same. Many of the mid-century details, introduced during the period of significance, remain as well. The main stairwell of the original building features original wood paneled walls and painted steel handrails with a geometric design, dating to before the BIOSIS occupancy. Original arches at the first floor within the stairwell have been preserved, though the doors have been replaced. Historic marble flooring is located here as well. The remainder of the building features finishes retaining the common appearance of mid-twentieth century commercial buildings, including LVT flooring, finished walls, and dropped tile ceilings. These finishes characterize the BIOSIS period.

Materials and Workmanship: The combination of early and mid-twentieth century building materials and design elements remains highly evident, with limited examples of exterior alterations not related to BIOSIS. The significant design elements of the building remain intact, including: the original building's primarily brick exterior, as well as the glass curtain walls of the 1982 section. Brutalist concrete window surrounds, dating to BIOSIS's first occupancy of the

building, remain on the 1913 section. The landscaped main entrance, marking the front door for the company, remains fully intact. At the interior, alterations to the various areas were necessary to maintain the building's continued and historic use as a cutting-edge bibliographic science database service company. While the building was sold by BIOSIS in the mid-1990s, the interior generally retains the finishes that represent the BIOSIS period. With minimal alterations to the exterior of the building and sympathetic interior updates, the BIOSIS building retains integrity of materials and workmanship.

Feeling and Association: The BIOSIS building retains the feeling and association of a twentieth century industrial and commercial building constructed. The expansion of the building is an integral part of the building's most substantial history as the headquarters of BIOSIS, which provided cutting-edge technological services to the world of indexing and research through the early-twenty-first century at this location. The exterior retains its complete appearance dating to the 1982 construction campaign which created the modern headquarters building for BIOSIS. This construction period marks a significant milestone for the company and represents its pinnacle in the history of science literature.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B. Property is associated with the lives of persons significant in our past.
- [ ] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark “x” in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [X] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
COMMUNICATIONS

Period of Significance
1966-1999

Significant Dates

1966
1982
1993
1999

Significant Person
(Complete only if Criterion B is marked above.)
N/A

Cultural Affiliation
N/A

Architect/Builder
Hayes, Frank Allison Wallace
Forrest, Robert E.
McHarg, Roberts and Todd

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The BIOSIS Headquarters Building at 2100 Arch Street is nationally significant under Criterion A in the area of Communications for its association with BIOSIS, the largest database publisher for the life sciences. The non-profit organization, also known as Biological Abstracts, founded in 1926, spearheaded the abstracting and indexing of millions of scholarly articles focused on life sciences and biology in the United States following World War I when German databases, which researchers and scientists had historically relied on, became inaccessible. While seemingly benign, the process of abstracting and providing indexed abstracts was critical to the scientific community, as it enabled a free flow of information amongst institutions and researchers. When the non-profit was initially founded, it operated out of the University of Pennsylvania Zoology Department Building from 1926 to 1946 and later converted row houses in West Philadelphia from 1946 to 1966. The building at 2100 Arch Street was the first purpose-built location for the company, and it represents the physical manifestation of the success and importance of BIOSIS to the study and advancement of the life sciences in the mid-twentieth century. The building is exceptionally significant as the location of BIOSIS's most important period of advancement into the digital age (from 1966 to 1999). During the period of significance, BIOSIS was "the world's largest life science abstracting, indexing, and access service," meeting Criterion Consideration G. [1] During the company's time at 2100 Arch Street, they developed new products that advanced the dissemination of scientific information.

The BIOSIS Headquarters Building at 2100 Arch Street is therefore particularly significant for its association with the advancement of life science and biological research through Criterion A, Communications and as its significance continued into the 1990s, the building meets Criteria Consideration G for resources less than 50 years old. The period of significance for the building is 1966-1999, starting when BIOSIS purchased the building and ending when the building at 2100 Arch was sold.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

Originally constructed in 1913 as a seed warehouse, the building at 2100 Arch Street is most significant for its association with BioSciences Information Systems, or BIOSIS. Founded in 1926 as Biological Abstracts, BIOSIS as it was called beginning in 1964, filled a need in the American scientific community for centralization and accessibility of biological research through the publication of its periodical *Biological Abstracts*. After outgrowing its first three homes, all located in either rented space or converted rowhomes adjacent to the University of Pennsylvania, the ever-expanding company purchased the warehouse building at 2100 Arch Street in 1966 and

[1] Kennedy, "BIOSIS to the Rescue," 309-310.

owned it until 1999. The relocation to the building aligned with the company's first IBM Main Frame computer purchase and its need for expanded space to accommodate its growth in the computer era. During BIOSIS's nearly 30 years of occupancy, the company transformed the building with complete internal renovations and more than doubled its size with the construction of the west portion of the building in 1982, its first purpose-built space. While located at 2100 Arch Street, BIOSIS experienced its greatest period of advancement under the innovative leadership of Dr. Phyllis V. Parkins and Dr. Ed Kennedy. The space and technological opportunity provided by the building, and especially by the addition, enabled BIOSIS to become "the largest biological abstracting and indexing service in the world."[2] Although related to the field of science, BIOSIS was first and foremost a disseminator of information through its databases and publications. Therefore, the BIOSIS Headquarters Building is significant in the area of Communications.

DEVELOPMENTAL HISTORY OF 2100 ARCH STREET:

The history of 2100 Arch Street begins in 1909, when William Henry Maule, the owner of a lumber and seed company Maule's Seed, purchased a string of properties on the 2100 Block of Arch Street, just west of Center City Philadelphia, Pennsylvania.[3] This would be the beginning of a long history which would shift from Maule's industrial use in the early twentieth century to BIOSIS' commercial use in the mid-twentieth century. The evolution of use is characteristic of many changing commercial spaces in Center City, Philadelphia, and the adapted use that defines the building today.

Maule's Seed, later the William Henry Maule Company, had occupied three different buildings throughout the previous 30 years, and was at that time operating out of seven-story modern office building at 18th and Market streets.[4] Seeking a new home for the company, Maule commissioned little-known architect Frank Allison Hayes, a University of Pennsylvania graduate, to design a building at 2100 Arch Street in 1912.[5] The Classical Revival style warehouse building served as the headquarters for Maule's Seed and, in addition to offices, contained warehouse space for "the immense variety of seeds, bulbs, and plants the Maule Company distributed across the country."[6]

[2] Kennedy, "BIOSIS to the Rescue," 309-310.
[3] Dennis Carlisle, "A Multi-use History, Sown From Maule's Seeds," *Hidden City Philadelphia*, October 14, 2013, accessed May 23, 2024, https://hiddencityphila.org/2013/10/a-multi-use-history-sown-from-maules-seeds/.
[4] Carlisle, "A Multi-use History, Sown From Maule's Seeds."
[5] Carlisle, "A Multi-use History, Sown From Maule's Seeds."
[6] Carlisle, "A Multi-use History, Sown From Maule's Seeds."

Figure 1: 1929 photo showing 2100 Arch Street, constructed 1913 for Maule's Seed. (Source: City of Philadelphia, Department of Records)

In 1913, construction was completed on the new "Maule Building" (later to become the BIOSIS building) at 2100 Arch Street at a cost of $100,000 (Figure 1).[7] The building had a footprint

[7] Carlisle, "A Multi-use History, Sown From Maule's Seeds."

measuring 60’ x 111’-8” and was constructed of a reinforced concrete with brick curtain walls. Standing at eight stories, the Maule Building was the tallest in the vicinity.[8] Maule died suddenly in 1913, the same year the building was completed.[9] The Maule Company continued its operations in the building until 1925, when the company began leasing warehouse and office space in Nicetown from their main competitor, the W.A. Burpee Company. Though the Maule Company vacated the building in 1925, they still owned it until 1946. In the interim, the company leased the office and warehouse space to a variety of tenants including the Prima Manufacturing Company, which produced washing machines.[10] The Maule Company sold the building at 2100 Arch Street to the John M. Maris Company in 1946 for $145,000; the sale financed the construction of a new building in Iowa as part of the company’s westward expansion. The Maule Company merged with their competitor W.A. Burpee in 1947.[11]

After purchasing the Maule Building at 2100 Arch Street, the John M. Maris Company used the space to produce glass bottles. In 1952, the John M. Maris Company sold the building, whose ownership bounced between a series of investors until 1957, when the Twenty-One Hundred Arch Corporation purchased the building for $1.[12] The corporation also purchased nearby properties on Arch Street at this time, including rowhouses abutting the newly coined “2100 Arch Building” to the west.[13] The corporation leased the building to various tenants, the most prominent being the Conoflow Corporation, which produced “regulators, actuators, positioners, transducers, and diaphragm seals.”[14] In 1957, the Twenty-One Hundred Arch Corporation demolished the rowhouses adjacent to 2100 Arch Street to make way for a small parking lot serving the building’s variety of tenants.[15]

[8] Carlisle, “A Multi-use History, Sown From Maule’s Seeds.”
[9] Carlisle, “A Multi-use History, Sown From Maule’s Seeds.”
[10] Carlisle, “A Multi-use History, Sown From Maule’s Seeds.”
[11] Carlisle, “A Multi-use History, Sown From Maule’s Seeds.”
[12] Tomezsko, *Fully Occupied Years*, 84.
[13] Tomezsko, *Fully Occupied Years*, 84.
[14] Carlisle, “A Multi-use History, Sown From Maule’s Seeds.”
[15] Carlisle, “A Multi-use History, Sown From Maule’s Seeds.”

THE LOCATIONS OF BIOSIS IN PHILADELPHIA

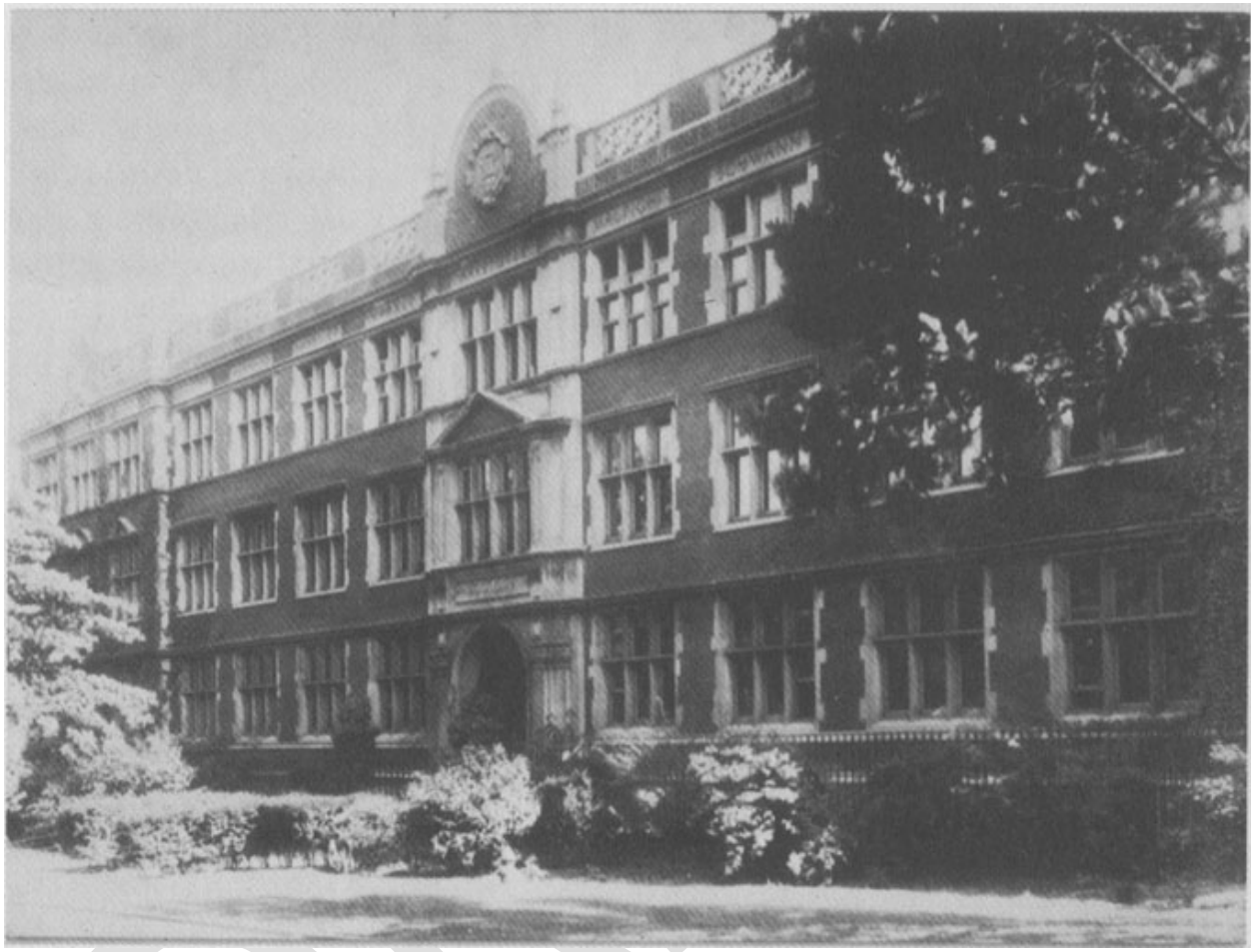

Figure 2: UPenn Zoology Department Building, Home of Biological Abstracts 1926-1946. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 54.*)*

In 1966, Twenty-One Hundred Arch Corporation sold the building to Philadelphia-based nonprofit, BioSciences Information Services, or BIOSIS, for $400,000.[16] BIOSIS, formally incorporated in 1927 as Biological Abstracts, was the publisher of a significant abstract periodical concerning the biological and life sciences titled *Biological Abstracts.* The organization was a pioneer in the field of writing abstracts for biological research and was indispensable in the indexing and disseminating of scholarly articles in the life sciences, to be outlined further below.[17] When the company was first incorporated, it operated out of the Zoology Department Building at the University of Pennsylvania (UPenn) (Figure 2).[18] UPenn's commitment to the support of Biological Abstracts is reflected in their continued use of UPenn buildings as their home.

[16] Carlisle, "A Multi-use History, Sown From Maule's Seeds."
[17] Kennedy, "BIOSIS to the Rescue," 309-310.
[18] William Campbell Steere, *Biological Abstracts/BIOSIS: The First Fifty Years- The Evolution of a Major Science Information Service* (New York: Plenum Press, 1976), 167.

In 1946, the company moved into a former residence at 3613 Locust Street, also provided by UPenn (Figure 3), which is no longer extant.

Figure 3: 3613 Locust Street (shown at right), Home of Biological Abstracts 1946-1950. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 169.)

In 1950, Biological Abstracts was relocated into one side of a UPenn address on Walnut Street (Figure 4). In 1958, Biological Abstracts purchased and renovated the adjacent space (Figure 5).[19] The Walnut Street buildings still exist today.

[19] Steere, *Biological Abstracts/BIOSIS*, 170.

Figure 4: 3815 Walnut Street, Left-Hand Unit Home of Biological Abstracts 1950-1960. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 170.)

In his *Biological Abstracts/BIOSIS: The First Fifty Years- The Evolution of a Major Science Information Service,* written to celebrate the company's 50-year milestone, William Campbell Steere wrote of the 1958 expansion:

> After more than thirty years of struggling along and making do in makeshift and inadequate corridors, Biological Abstracts was finally housed in a building of its own, and one specifically designed for the first time to meet its current and expanding professional needs![20]

Though the interior was renovated for the functions of Biological Abstracts, the building itself was constructed and designed long before. Still, the renovation of the interiors per their needs allowed the company to grow. However, in a few short years, "an increase of staff and personnel, both professional and clerical" caused by increased production forced the company to once again seek a new home.[21]

[20] Steere, *Biological Abstracts/BIOSIS*, 173.
[21] Steere, *Biological Abstracts/BIOSIS*, 174.

Figure 5: 3815 Walnut Street after Renovation, Both Sides Home of Biological Abstracts 1960- 1967. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 172.)

After years of expansion, BIOSIS required a large, permanent space where they could encourage technological advancement and increased services in the company. Biological Abstracts, rebranded as BIOSIS in 1964 to accommodate their growing vision for the organization, had begun the process of digitizing their publications to supplement their existing printed works. The new IBM computer they purchased for this purpose needed space for its large mainframe, as well as newly established departments and a growing staff.[22] Additionally, BIOSIS wanted to consolidate all of its operations to allow for easier collaboration. At the time, "largely for lack of space for the requisite personnel…professional typing of abstracts for offset printing [took place]

[22] Steere, *Biological Abstracts/BIOSIS*, 178.

in other areas where both space and personnel were more easily available."[23] A larger space would provide one roof under which all departments could gather and be more interconnected (Figure 6).

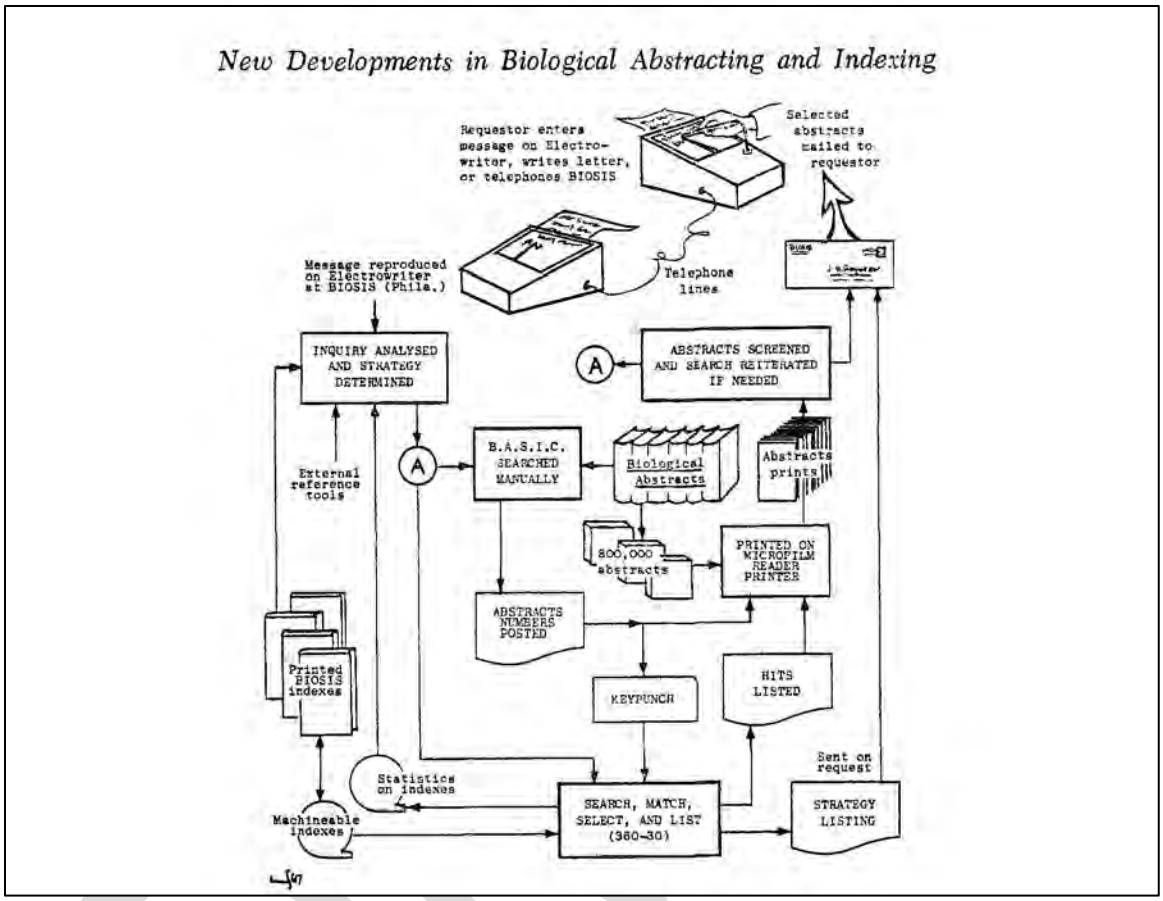

Figure 6: 1968 diagram showing the BIOSIS search system created by Louise Schultz. (Source: *New Developments in Biological Indexing and Abstracting,* 347.)

Relocation was necessary, and, in 1964, the BIOSIS Board of Trustees approved the purchase of a new building at 2100 Arch Street (Figure 1).[24] This was the company's first location that was not "on or adjacent to the campus of the University of Pennsylvania and, until 1959, the property of that institution."[25]

BIOSIS AT 2100 ARCH STREET

In 1966, BIOSIS officially purchased the factory and warehouse building at 2100 Arch Street for $400,000.[26] Because of the building's previous use and subsequent vacancy, the interior was in

[23] Steere, *Biological Abstracts/BIOSIS*, 180.
[24] Steere, *Biological Abstracts/BIOSIS*, 174.
[25] Steere, *Biological Abstracts/BIOSIS*, 167.
[26] Carlisle, "A Multi-use History, Sown From Maule's Seeds."

extremely poor condition, with "dark and scarred walls and debris and grease-covered floors."[27] In order to accommodate the company's needs, BIOSIS began a renovation of the building's interior, including the reconfiguration of the plan and the replacement of some finishes to accommodate its future commercial use (Figures 7-9). The interior retained many of the original details in the more primary spaces, such as stairwells and lobbies, despite it being "repulsively dirty and dingy, as might have been expected of a vacated factory building."[28]

Figure 7: 2100 Arch Street, Home of Maule's Seeds 1913-1924, Home of BIOSIS 1967-1999. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* iii.)

BIOSIS commissioned architect Robert E. Forrest of Forrest and Associates to design the renovations and hired contractors A. Raymond Raff and William Pardue to complete them.[29] Between 1966 and 1968, Forrest, Raff, and Pardue renovated the building one floor at a time and BIOSIS staggered its move to the new building. Employees began to relocate to the building immediately, a process which was spaced out as their respective floors were complete. In 1966, a

[27] Steere, *Biological Abstracts/BIOSIS*, 174.
[28] Steere, *Biological Abstracts/BIOSIS*, 174.
[29] "2100 Arch Street," Application for Zoning Permit, *City of Philadelphia Department of Licenses & Inspections*, 1966-1968.

new IBM computer was installed on the first floor in the midst of construction, beginning the workplace transfer.[30] The scope of work for the renovations included new finishes, updated mechanical, electrical, and plumbing systems, and a new elevator.[31] The renovation also created a lobby at the Arch Street entrance (Figure 7, no longer extant), as well as new office space on floors that once functioned as warehouse or factory space—offices had previously been limited to the third and eighth floors (Figure 8).[32] Two floors were left unfinished with the assumption that BIOSIS would grow into them as expansion continued.[33]

Figure 8: 1966 photo showing 2100 Arch Street prior to BIOSIS 1966-1968 renovation. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 175.)

In 1968, BIOSIS completed the renovation of the eighth floor, and the executive offices moved from where they had been temporarily located in a storage space. This was the last space completed, concluding the two-year renovation and relocation process, the plan of which is similar today.[34] The final result was a "beautiful, pleasant, and functional interior…the result of an extensive and creative renovation."[35] In 1968, BIOSIS sold the Walnut Street building back to UPenn at a reduced cost.[36]

[30] Steere, *Biological Abstracts/BIOSIS*, 177.
[31] "2100 Arch Street," permit application, September 1, 1966.
[32] "2100 Arch Street," permit application, September 1, 1966.
[33] Steere, *Biological Abstracts/BIOSIS*, 177.
[34] Steere, *Biological Abstracts/BIOSIS*, 177.
[35] Steere, *Biological Abstracts/BIOSIS*, 176.
[36] Steere, *Biological Abstracts/BIOSIS*, 176.

Figure 9: Circa 1970 photo showing the main entrance after the BIOSIS 1966-1968 renovation of 2100 Arch Street, and prior to the construction of the 1982 addition. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*. 176.)

Figure 10: Circa 1975 photo showing the editorial space after the BIOSIS 1966-1968 renovation of 2100 Arch Street. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 178.)

Figure 11: Circa 1975 photo showing tape drives in the computer room after the BIOSIS 1966-1968 renovation of 2100 Arch Street. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 154.)

Figure 12: Circa 1975 photo showing Keypunch machines at 2100 Arch Street. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 150.)

By 1975, BIOSIS had expanded into the two floors that were left unfinished during the 1966-1968 renovation (Figures 9-12), and by 1976, it was apparent that BIOSIS would need more space within the next five years.[37] Steere described BIOSIS as "a molting hermit crab that must seek a larger shell because of its genetically programmed tendency to grow larger." After just ten years in 2100 Arch Street, "our hermit crab will be looking for a new and larger shell."[38]

[37] Steere, *Biological Abstracts/BIOSIS*, 177.
[38] Steere, *Biological Abstracts/BIOSIS*, 181, 167.

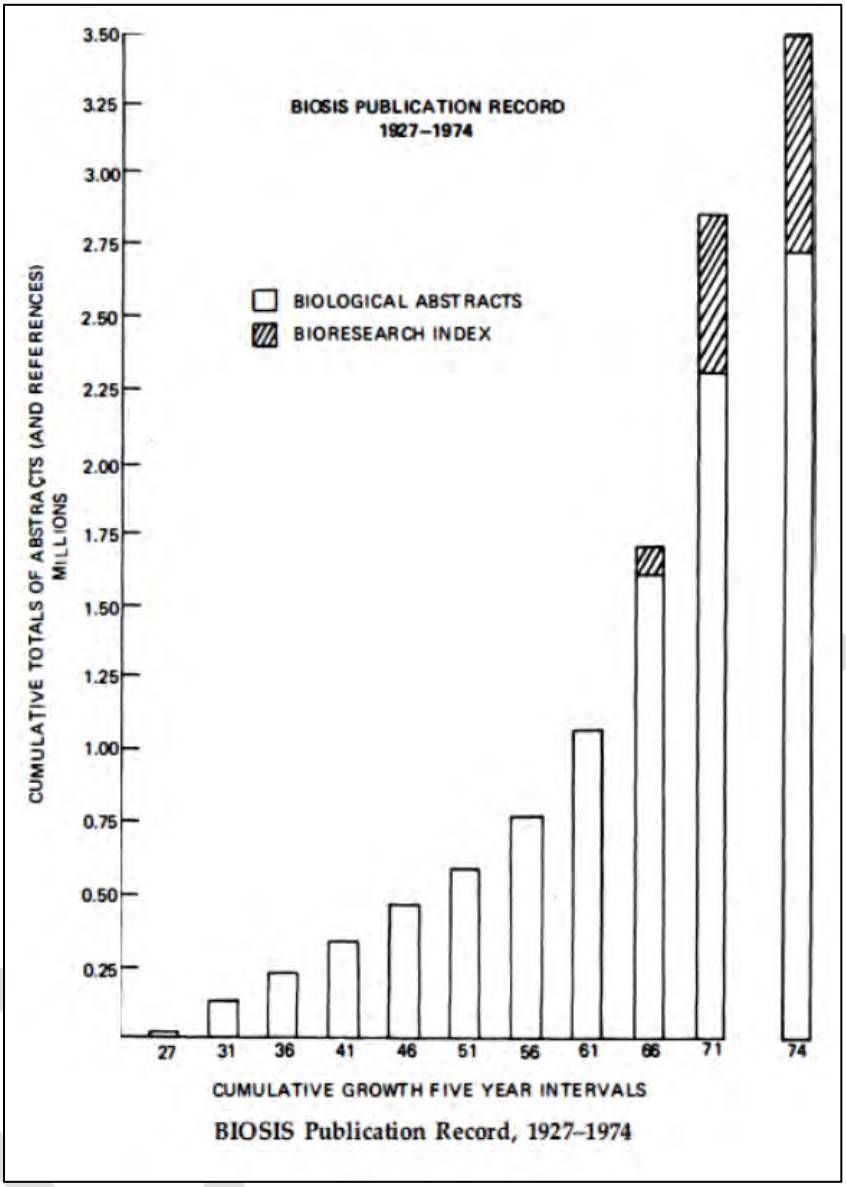

Figure 13: Chart showing publication growth of *Biological Abstracts* from 1927-1974. (Source: Steere, *Biological Abstracts/ BIOSIS: The First Fifty Years*, 144.)

In 1974, the BIOSIS database, including 240,000 references, was made available to the National Technical Information Service, growing business substantially (Figure 13).[39] Between 1975 and 1976, the updated BIOSIS databases were made commercially available for online searching.[40] During this period, BIOSIS's operations, equipment, and number of employees had drastically

[39] Monica Nees and Hannah O. Green, "THE BIOSIS DATA BASE: EVALUTATION OF ITS INDEXES AND THE STRATBLDR, CHEMFILE, STAIRS AND DIALOG SYSTEMS FOR ON-LINE SEARCHING" (Washington, D.C: National Aeronautics and Space Administration, September 1977). 2.
[40] Monica Nees and Hannah O. Green, "The BIOSIS Data Base: Evaluation of Its Indexes and the STRATBLLDR, CHEMFILE, STAIRS and DIALOG Systems for On-Line Searching" (Washington, DC: NASA, 1977), 2.

increased, including many offices, likely to accommodate these technological advances. In 1979, following their solidified success with the introduction of these systems, BIOSIS commissioned the planning and architecture firm Wallace, McHarg, Roberts and Todd (now WRT) to conduct a study on BIOSIS's options for expanding their space.[41]

WRT's study aimed to determine the need for space, propose and evaluate options to create space, and recommend the best option for BIOSIS.[42] After determining the building was already too small by common spatial standards in 1979, with employees working in "slightly crowded conditions," WRT deliberated four options to accommodate this growth:[43]

1. Site development potential at present site on the existing parking area
2. Development potential of sites in the vicinity within a four-block area along Arch Street
3. Opportunities in Center City and University City Science City
4. Three suburban locations situated along public commuter rail lines:
    I. North of Philadelphia in the King of Prussia area
    II. Northwest of Philadelphia in the Villanova-Bryn Mawr area
    III. Southwest of Philadelphia in the Swarthmore area.[44]

WRT concluded that the most practical and cost-effective way for BIOSIS to meet its spatial needs was option one: to keep the existing building at 2100 Arch Street and construct an addition in the adjacent parking lot, which served only 10 percent of BIOSIS employees.[45] WRT proposed two potential options for the addition: a six-story addition and an eight-story addition that would be of equal height with the original 1913 building (Figure 1).[46] Impressed with WRT's work on the study, BIOSIS hired the firm to design the new addition, which would double the size of the existing building.[47]

On April 25, 1980, BIOSIS broke ground on its new addition, with WRT as architects and the Turner Construction Company as contractors.[48] Construction lasted until 1982 and cost BIOSIS $6 million. It resulted in a visually distinct, yet compatible addition (Figures 14-16) that increased the total square footage of the building from approximately 58,500 to 119,500.[49] The retention of the 1913 office building and the addition of a distinct, yet compatible, mass aligned with the reigning preservation philosophy of this time: to leave the historic building alone and

[41] Wallace, et al., "Projections and Requirements for Future Expansion," 2.
[42] Wallace, et. al., "Projections and Requirements for Future Expansion," 2.
[43] Wallace, McHarg, Roberts, and Todd, "Proposal for Future Requirements," Report on Behalf of Biosciences Information Services, 2100 Arch Street, Philadelphia, Pennsylvania, unpublished mss. (October 10, 1979), 5.
[44] Wallace et al, "Projections and Requirement for Future Expansion," 6.
[45] Wallace et. al., "Projections and Requirements for Future Expansion," 6.
[46] Wallace, et al, "Proposal for Future Requirements," 45-47.
[47] Wallace, et al, "Proposal for Future Requirements," 1.
[48] Tomezsko, *Fully Occupied Years*, 133.
[49] "2100 Arch Street," permit application, September 8, 1980.

insure the new addition fit, but did not create a false sense of history.[50] WRT favored this approach to completing work on historic buildings. Once the scope of WRT's contract with BIOSIS progressed from a planning study to an architectural design, Charlie B. Tomlinson, Jr. took over the project as principal architect.[51] His design married the old and the new, embodying the firm's approach to past projects on historic buildings, that is to preserve the historic structure and add an addition that was visually distinct yet compatible with the original construction. Tomlinson emphasized the commitment to "not touching" the historic building and "not tricking people" by making the addition identical to the original construction.[52]

Figure 14: Rendering of 2100 Arch Street with 1982 Addition, Home to BIOSIS 1982-1999. (Source: *Fully Occupied Years: The Rise and Fall of a Company Called BIOSIS,* 83.)

These principles manifested in 2100 Arch Street. The strikingly modern appearance of the glass curtain walls showcased BIOSIS' continuing efforts to modernize and embrace new technology, while the preservation of the historic structure acknowledged its past importance.

[50] Charles "Charlie" B. Tomlinson, Jr.," interview by Cindy Hamilton, May 31, 2024.
[51] Charles "Charlie" B. Tomlinson, Jr.,"
[52] Charles "Charlie" B. Tomlinson, Jr."

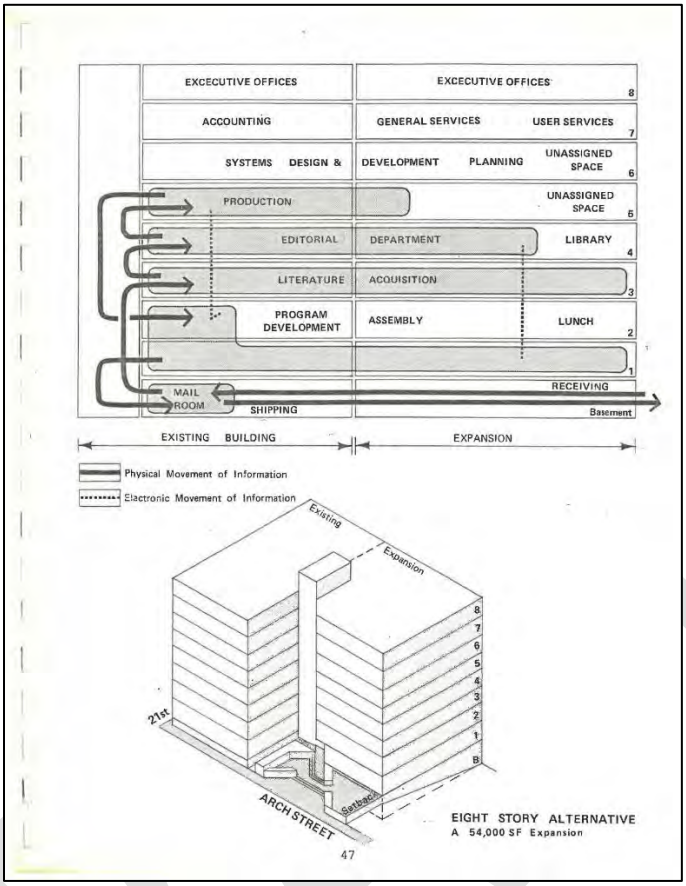

Figure 15: WRT Plan for the proposed eight-story addition to 2100 Arch Street. (Source: *Projections and Requirement for Future Expansion*, 8.)

Figure 16: A 1982 advertisement for the unoccupied upper floors of the 2100 Arch Street addition. (Source: *Philadelphia Inquirer, September 15, 1982,* 78.)

Figure 17: IBM 4341 Computer *(*Source: Ca. 1970s IBM 4341 Brochure) IBM Field Engineering Division, IBM 4341 Processor *(*White Plains, NY*: International Business Machine Corporation,* ca. 1974, *3.* https://bitsavers.trailing-edge.com/pdf/ibm/brochures/IBM4341Processor.pdf.

The approximately 61,000 square feet comprising the addition provided much needed space for BIOSIS. The entire second floor of the addition housed computer systems and operations, including a new IBM 4341 Computer (See Figure 17 for an example).[53] Mainframes of this model ranged from the size of a whole room to about the size of a large refrigerator. The addition also doubled the space allotted to both editorial services and literature resources.[54] The addition was designed with the future in mind, leaving the top three stories unoccupied with the expectation that BIOSIS would grow into in the next ten years. BIOSIS leased the vacant space to unaffiliated tenants, such as attorneys David C. Harrison, Stephan E. Andersson, Henry W. DeLuca, and Jerome Reitano, and real estate company FMC Acquisitions, Inc., who were tenanted through Harold B. Hess Co. Realtors to supplement the income of the company.[55]

BIOSIS never grew to its projected size due to funding issues (as described below) and never occupied the seventh and eighth stories of the addition. The same embrace of technology that necessitated a larger space in 1979 led to the redundancy of that space in the 1990s as technology once again changed and simplified. The addition, however, had provided much needed space for the IBM computer mainframe and for the many employees working in the building. Historian George Tomezsko observes that when BIOSIS redesigned their digital systems to end dependence on a large mainframe by turning to personal computers and utilizing floppy and compact discs for storage, "the floor space and the large computer room in that building were simply no longer needed."[56] The large space was also rendered superfluous through mass layoffs that had decreased the size of staff throughout the 1990s.[57]

[53] Wallace, et al, "Proposal for Future Requirements," 25.
[54] Wallace, et al, "Proposal for Future Requirements," 17-18.
[55] "Office Space," *The Philadelphia Inquirer,* Jan 17, 1982, 202.; "Estate Notices," *Philadelphia Daily News,* May 29, 1986.; "Estate Notices," *Philadelphia Daily News,* June 5, 1990.; "Change of Name Notice," *Philadelphia Daily News,* June 30, 1987.; "Legal Notices," *Philadelphia Daily News,* June 16, 1989.
[56] Tomezsko, *Fully Occupied Years,* 160.
[57] Tomezsko, *Fully Occupied Years,* 160.

Between 1987 and 1989, over 1.5 million records were added to BIOSIS' database.[58] Computers and technology would continue to advance during this era, and by the early 1990s, PCs became commonplace across departments.[59] However, the building, which was outfitted for the first wave of computer indexing and online searching, was soon rendered obsolete as technology evolved. Sales declined dramatically in the 1990s, bringing the evolution of BIOSIS to a halt. The last Executive Director that shepherded the company to success, Dr. H.E. Kennedy, retired in 1993, marking the end of a golden era. In 1999, after over 30 years of tenure at 2100 Arch Street, BIOSIS sold the building to the Jewish Federation of Greater Philadelphia for the cost of $5.646 million. BIOSIS relocated to a smaller suite at 2001 Market Street.[60] The Jewish Federation of Greater Philadelphia remained in 2100 Arch Street until 2023, when developer MM Partners purchased the building for $12 million.[61] The building has remained vacant since MM Partner's purchase.

CRITERION A: COMMUNICATIONS

The BIOSIS Headquarters Building at 2100 Arch Street is nationally significant under Criterion A in the area of Communications for its association with BIOSIS, the non-profit organization that spearheaded the abstracting and indexing of millions of scholarly articles surrounding the life sciences, first in print and eventually in digital form. BIOSIS occupied the building during its most significant period of productivity and technological advancement, 1966 to 1999, the building's period of significance.

HISTORY OF BIOLOGICAL ABSTRACTS/BIOSIS

Founded in 1926, Biological Abstracts (the company, abbreviated "BA") filled a need in the American scientific community for centralization and accessibility of research through the publication of its periodical *Biological Abstracts* (the publication, abbreviated "*BA*"), which contained abstracts of published scholarly research focused particularly on the biological sciences. Abstracts are short statements (200-300 words, typically) that summarize a research paper, providing an incomparably helpful research tool for deciphering which papers might answer a particular question for researchers. They typically include a research question, methods, and conclusions from a given paper, and inform a researcher if the subject is relevant to them and if the full paper is worth reading.[62] Today, it is the onus of the author of a work to write their own abstract, but this was not common practice in biological research in the early twentieth century. Instead, secondary authors were responsible for abstracting research and circulating abstracts through periodicals. This type of database service had previously been nonexistent for

[58] E. Hodas, M. O'Hearn, and M. Kelly, "BIOSIS as an Agricultural Information Resource," In *New Horizons in Agricultural Information Management. Proceedings of an International Symposium, March 13-16, 1991, Beijing, China*, ed. Gary K. McCone (Ottawa, Ontario: The International Development Research Center, May 1991). 400.
[59] Tomezsko, *Fully Occupied Years*, 117.
[60] "Job Advertisement: BIOSIS Marketing/Product Developer," *The Philadelphia Inquirer*, June 18, 2000, np.
[61] Carlisle, "A Multi-use History, Sown From Maule's Seeds."
[62] Aileen Fyfe, "Where did the practice of 'abstracts' come from?" A History of Scientific Journals, The Royal Society Journal Publishing July 8, 2021. https://arts.st-andrews.ac.uk/philosophicaltransactions/where-did-the-practice-of-abstracts-come-from/

the life sciences in the United States prior to World War I, though others, such as that in the chemical sciences, existed well before.

Abstract periodicals like *Biological Abstracts* evolved as a tool categorically compiling the research of others, which was sometimes inaccessible or difficult to find, to those seeking particular information. Abstract periodicals answered the needs of researchers to efficiently find information related to their study. The practice of abstracts began when the value of short summaries of research papers was recognized, benefitting those who could not access original documents. In the late eighteenth century, the London, England-based Royal Society coined the term "abstract," to be used in this way, and in the following century, some entrepreneurs established journals with the sole purpose of providing summaries of other journals. By the mid-nineteenth century, German publishers and societies were leading the effort.[63] Other scientific abstract journals had begun emerging in the United States in the nineteenth century as well, including *Science Abstracts*, first published in 1898, which covered general physics, light, heat, sound, electricity, and other areas related to the physical sciences.[64]

The demand for an American abstracting periodical in the life sciences and biology stemmed from World War I and its effects on the accessibility of the foreign abstracting services which Americans had historically relied upon. European predecessors offered abstracting services on biological research, but prior to 1917, America did not have such a service.[65] American biologists depended primarily on German abstracting and indexing publications in the fields of botany, bacteriology, and zoology.[66] With World War I, the services of German abstracting agencies were no longer available to Americans. This created an extreme need for abstracting periodicals concerning the biological fields in America, allowing the sciences to evolve, and necessary research to remain accessible.[67]

Abstracts of Bacteriology and *Botanical Abstracts*, the first American abstracting services dedicated to the life sciences, were first published in 1917 and 1918 respectively, as a result of the difficulties created by the war.[68] These periodicals answered some of the need, relieving that of zoologists, physiologists, and anatomists; however, many groups were left without a proper abstracting service for their research needs until publication was planned to resume in Germany after the end of World War I. Though noble in their pursuit to provide abstracting services to the sciences in American in the interim, these smaller publications were too small to be properly financed and organized.[69] The American Chemical Society founded *Chemical Abstracts* in 1907, setting the stage for a wide-ranging periodical that covered many sub-focuses within a given

[63] Fyfe, "Where did the practice of 'abstracts' come from?"
[64] "Inspec History: 1898 - 1914," The Institution of Engineering and Technology, accessed June 24, 2024, https://www.theiet.org/membership/library-and-archives/the-iet-archives/iet-history/history-of-science-abstracts-and-inspec/inspec-history-1898-1914.
[65] Steere, *Biological Abstracts/BIOSIS*, 13.
[66] John E. Flynn, *A History of Biological Abstracts* (Philadelphia: Biological Abstracts, October 1951), 1.
[67] Steere, *Biological Abstracts/BIOSIS*, 13.
[68] Bernadette Freeman, "Growth and Change in the World's Biological Literature as Reflected in BIOSIS Publications," *Publishing Research Quarterly* 11 (Fall 1995): 62.
[69] Flynn, *A History of Biological Abstracts*, 1.

field. The biological community needed its own all-encompassing service, resolving the wavering viability of the aforementioned smaller, more focused periodicals. *Biological Abstracts (BA)* would become the solution for the biological science community.[70] As a result of an informal meeting of biologists who sought a wider ranging abstracting service for the biological sciences, *Biological Abstracts* was conceptualized, establishing a singular periodical that covered all biological literature, offering an all-encompassing solution to the several smaller, more specialized periodicals only focusing on a specific field.[71]

In 1922, the Division of Biology and Agriculture of the National Research Council and the Union of American Biological Societies (UABS), which represented nearly all the scientific societies in the United States interested in biological science research, appointed a Joint Publication Committee to study the status and needs of bibliography in biology. After two years of study, the Committee published a report that confirmed the viability of a singular abstracting journal. The report recommended that a single abstracting journal for the biological sciences be established in the United States, creating a similar publication to that of *Chemical Abstracts.*[72]

Dr. J.R. Schramm, who would go on to run *Botanical Abstracts* as a "labor of love," was one of the main advocates for one consolidated *BA.*[73] The other leader was Dr. L.S. McClung, president of the Union of American Biological Societies.[74] In November 1923, as a culmination of their study, Schramm published a report in the *Science* journal laying out a plan for "providing biologists with a comprehensive abstracting and indexing service" with an accompanying survey to gauge the interest of the readership in the proposed product and the amount of readers that might subscribe to the product.[75] It was in this report that "*Biological Abstracts"* first appeared in print. The report was unanimously adopted by all the parent organizations involved, with the opinions of American biologists considered a priority. The Joint Publications Committee felt that biologists should have the opportunity to express themselves individually on the proposal of the publication. It was submitted by mail to the entire membership of the 20 biological societies which made up the Union of American Biological Societies. The report was approved by about 83 percent to 97 percent of the voting membership of these 20 societies. This confirmed the Joint Publication Committee's next step: to establish *Biological Abstracts.*[76]

The Joint Publication Committee, with the support of the National Research Council, sought financial backing from the Rockefeller Foundation.[77] The Rockefeller Foundation was interested in financing the endeavor, but insisted on evaluating the attitude of European biologists towards a new abstracting service under American supervision before they would back the enterprise. In summer 1924, Drs. Schramm and McClung travelled Europe to gauge interest in *BA* as "an

[70] Steere, *Biological Abstracts/BIOSIS*, 42-43.
[71] Flynn, *A History of Biological Abstracts*, 1.
[72] Flynn, *A History of Biological Abstracts*, 1.
[73] Steere, *Biological Abstracts/BIOSIS*, 51.
[74] Steere, *Biological Abstracts/BIOSIS*, 51.
[75] "Biological Abstracts," *Science* LX, no. 1561 (November 28, 1924): 485.
[76] Flynn, *A History of Biological Abstracts*, 1.
[77] Flynn, *A History of Biological Abstracts*, 2.

American enterprise, but with international coverage."[78] Due to positive interest in the idea, the Rockefeller Foundation committed $350,000 to the planned *Biological Abstracts* journal, to be paid over a 10-year period.[79]

Schramm became editor-in-chief of *BA.* This periodical would satisfy the need for one centralized system of abstracting hundreds of thousands of scholarly research articles in the fields of bacteriology, botany, and zoology in the United States. A full six years elapsed between the first informal meeting to consider the conception of *Biological Abstracts* in December 1920, and the appearance of the first issue in December 1926.[80]

BIOLOGICAL ABSTRACTS, 1924-1964

The first issue of *Biological Abstracts* (*BA*) was published in December 1926, initially functioning as an unincorporated enterprise directed by the Joint Publications Committee. Biological Abstracts (BA), the company, formally incorporated in Washington, D.C. as a non-profit organization in March 1927.[81] With Schramm as editor-in-chief, Dr. John E. Flynn as assistant editor, and Alice Stephenson as business manager, Biological Abstracts set to work. McClung, the president of Union of American Biological Societies (UABS), was chair of the Zoology Department at the University of Pennsylvania (UPenn), and he provided BA with its first home. Thanks to McClung, BA received an invitation from the UPenn to establish editorial offices on their campus.[82] From 1925 to 1946, BA operated out of office space at the UPenn Zoology Department Building, which they occupied at no cost.[83]

In 1928, the Rockefeller Foundation began releasing the funds they committed in 1924 at a rate of up to $85,000 a year. The Rockefeller Foundation generously authorized the Joint Publications Committee to expend their grant of $350,000 at a faster rate than originally proposed. The funding was provided only for editorial costs, meaning that BA still had to generate funding for all other expenses.[84] By 1929, the initial grant was already dwindling, having been expended much faster than anticipated. Biological Abstracts was dependent on external funding as a fledgling non-profit organization. Luckily, the Rockefeller Foundation agreed to extend their grant for two additional years. The Trustees of the Joint Publications Committee, following a continued desperate need for funding, approached the Rockefeller Foundation for a commitment of $1,100,000 to provide for *BA* over the following decade, between 1931 and 1941.[85]

Following the beginning of the Great Depression, BA began to suffer financially. The total earned incomed in 1931 fell short by $6,887 from defraying the publication expenses, not

[78] Steere, *Biological Abstracts/BIOSIS*, 183.
[79] Steere, *Biological Abstracts/BIOSIS*, 51. Over $6.4 million in 2024.
[80] Steere, *Biological Abstracts/BIOSIS*, 41.
[81] Steere, *Biological Abstracts/BIOSIS*, 3.
[82] Flynn, *A History of Biological Abstracts*. 2.
[83] Steere, *Biological Abstracts/BIOSIS*, 3.
[84] Steere, *Biological Abstracts/BIOSIS*, 3.
[85] Flynn, *A History of Biological Abstracts*.

including editorial costs. These costs, pulled from the Rockefeller Foundation grant, were about $80,000.[86] Two different foundations produced reports endorsing *BA* as a necessary research tool; however, there was no suggestion of how its earned income could meet its budget. With the country still in the throes of the Great Depression, the Rockefeller Foundation had other unavoidable demands requiring their funding. At this time, the foundation had been investing in the progress of the sciences at large, also subsidizing *Psychological Abstracts* and *Social Science Abstracts*, adding to their financial stress in this era.[87]

In 1935, the Joint Publications Committee requested additional funding from the Rockefeller Foundation to address their lack of income. In response, the Rockefeller Foundation announced that they would provide no more funding. By then, they had contributed a total of $723,000 to get *BA* up and running.[88] Starting in 1936, Schramm opted to suspend his salary because money was so tight, and he did not want to see the organization fail. In 1937, strenuous attempts to obtain financial commitments from different Biological Societies were made, however the company acquired less than half the money needed. A handful of universities with committed science departments renewed their subscriptions to *BA*, but far less than anticipated. In the cases of those who did renew, funding was pulled not from a library budget, but from personal contributions by biologists on the university faculties.[89] It was clear that though the country struggled financially, the science community did indeed support the efforts of BA, expending their own personal money to keep *BA* afloat. Though these individuals' efforts to sustain the company were valiant, BA had to temporarily suspend their publication of their abstract journal because they simply could not afford to produce it.[90] The same year, Schramm left BA to accept a position as professor of botany at UPenn, and assistant editor John Flynn became acting editor-in-chief.[91]

Publication of *Biological Abstracts* resumed in 1938 with funds raised from the sale of current subscriptions and a few institutional subsidies.[92] Biological Abstracts struggled through the early 1940s, continuing to turn to libraries and the academic community to raise funds. In order to expand their subscriber base, BA broadened their database, including sections on the "Abstracts of Food" and "Nutrition Research," which was established after recognizing a need in the nutrition and food technology field, and the "Abstracts of Human Biology," which was instituted at the suggestion of the American Association of Physical Anthropologists, who wanted expanded coverage of literature.[93] Though struggling, their attempts at finding a viable base to support their efforts and subscriptions pressed on. In 1946, BA finally began to stabilize. They outgrew the Zoology Department Building and made their first of many moves due to a lack of

[86] Flynn, *A History of Biological Abstracts*, 3. Over $1.7 million in 2024.
[87] Flynn, *A History of Biological Abstracts*, 5.
[88] Steere, *Biological Abstracts/BIOSIS*, 3. Over $16.6 million in 2024.
[89] Flynn, *A History of Biological Abstracts*. 5.
[90] Steere, *Biological Abstracts/BIOSIS*, 4.
[91] Steere, *Biological Abstracts/BIOSIS*, 4.
[92] Flynn, *A History of Biological Abstracts*, V.
[93] Flynn, *A History of Biological Abstracts*, IV.

space. Once again supported by UPenn, BA set up shop in an old residence on Locust Street, previously utilized by the University.[94]

Already technologically forward-thinking, in 1948, BA switched from letterpress printing to offset printing using new IBM typewriters, and in 1949, published its first full issue using offset printing.[95] This era, through to the 1960s, would prove to be a time of upheaval and growth for the company. In 1950, BA received federal funding for the first time when the Office of Naval Research (ONR) contracted $22,000 to Biological Abstracts to speed up publication of delinquent indexes.[96] This contract solidly stabilized the company. The same year, BA relocated to a larger space for a second time, settling in another UPenn property on Walnut Street, formerly a row house. BA occupied one half of the building.[97] Just one year later, in 1951, Dr. Flynn suffered a heart attack and when he returned to work, found himself usurped by his temporary replacement.[98] Amidst the internal drama, BA continued slowly expanding, and in 1953, G. Miles Conrad was named temporary manager, taking over for Dr. Flynn, and was officially appointed as director soon after.[99] The same year in 1953, Dr. Phyllis V. Parkins joined the editorial staff, and she worked closely with Conrad to push the company forward. In 1957, BA, which until then had focused solely on the publication of *Biological Abstracts*, first tried its hand at indexing, which was another popular tool utilized by scholars and researchers. [100]

The process of indexing refers to the naming of a file and the organization of that file in relation to others. Essentially, it is the tagging and categorization process that provides ease in locating and retrieving information within a given set of documents. By identifying and extracting key identifiers from inside a document, indexing allows a quick way of finding information.[101] The history of indexing in the United States did not begin until the mid-nineteenth century with William Frederick Poole's *Index to Periodical Literature*, which though not in the sciences, paved the way for future American indexes.[102] At this time, indexes were done by hand.[103]

By the invention of index-capable computers in the 1950s, the process of creating and searching indexes drastically changed. The computer age transformed the process of indexing, making

[94] Steere, *Biological Abstracts/BIOSIS*, 5.
[95] Steere, *Biological Abstracts/BIOSIS*, 5.
[96] Steere, *Biological Abstracts/BIOSIS*, 5. Over $282,000 in 2024.
[97] Steere, *Biological Abstracts/BIOSIS*, 5.
[98] Steere, *Biological Abstracts/BIOSIS*, 6.
[99] Steere, *Biological Abstracts/BIOSIS*, 6.
[100] John Simkin, "A Brief History of Indexing," Australian and New Zealand Society of Indexers (ANZSI), accessed June 24, 2024, https://www.anzsi.org/about-indexing/a-brief-history-of-indexing
[101] "Document Indexing: What Is It and Why Is It Important?" SecureScan, September 19, 2023, https://www.securescan.com/articles/document-scanning/document-indexing-101-what-is-indexing-and-why-is-it-important/.
[102] *Encyclopedia Britannica*, s.v. "William Frederick Poole," accessed June 24, 2024, https://www.britannica.com/biography/William-Frederick-Poole.
[103] "Document Indexing: What Is It and Why Is It Important?" SecureScan, September 19, 2023, https://www.securescan.com/articles/document-scanning/document-indexing-101-what-is-indexing-and-why-is-it-important/.

possible the establishment of large databases, and allowing for easier, faster research.[104] In the early days of computerized indexing at Biological Abstract, indexing services were provided by IBM, who invented the first computer with indexing capabilities, the 1954 IBM 704.[105] Considering these technological advances and Biological Abstract's commitment to positioning themselves at the cutting edge, the company once again required additional physical space to accommodate their technology and offices. BA purchased their quarters on Walnut from UPenn and bought the other half of the building as well, renovating it into one large space.[106]

In 1961, Biological Abstracts assumed the responsibility of indexing from IBM, producing its first machine-prepared author index for the purpose of expanding their bibliographical database services beyond abstracts and into indexes. This solidified BA's transition from merely an abstracting service to both an abstracting and indexing service.[107] Also in 1961, the most recent publication of *Biological Abstracts* hit a major milestone: BA had published its one millionth abstract.[108]

Between 1926 and 1964, Biological Abstracts provided a much-needed resource to the biological community and displayed their commitment to the cutting edge. Conrad, with Parkins at his side, set the ball in motion in terms of mechanizing BA and growing its business. During the 1950s and early 1960s, the volume of abstract coverage by the company grew. In the five years between 1958 and 1962, the number of items published in *BA* annually increased from 42,575 to 100,858.[109] When Conrad passed away in 1963, Parkins took over BA. Though the pair accomplished much, it was under the leadership of Parkins that Biological Abstracts began an age of progress and a jump into the digital age.[110]

THE PARKINS ERA, 1964-1975

Dr. Phyllis V. Parkins was appointed director pro tempore by the board of Biological Abstracts in September 1964 and immediately began making changes in the company. In October, Parkins rebranded Biological Abstracts as "BioSciences Information Services of Biological Abstracts," or "BIOSIS." This was to delineate between Biological Abstracts the company and *Biological Abstracts* the publication. It was also a recognition that the company provided more than just the eponymous publication; it offered indexing in addition to abstracting and published more specific abstracting journals under the BA company umbrella.[111] After a six month search for a director, motivated by the board's reluctance to have a female leader, the board finally appointed

[104] Simkin, "A Brief History of Indexing."
[105] "IBM's Major Milestones and Achievements," ThoughtCo, accessed June 24, 2024, https://www.thoughtco.com/ibm-timeline-1992491.
[106] Steere, *Biological Abstracts/BIOSIS,* 7.
[107] Steere, *Biological Abstracts/BIOSIS,* 7.
[108] Freeman, "Growth and Change," 71.
[109] Freeman, "Growth and Change," 62.
[110] Steere, *Biological Abstracts/BIOSIS,* 8.
[111] Steere, *Biological Abstracts/BIOSIS,* 9.

Parkins as the first female director of the newly coined BIOSIS on a permanent basis in April 1965.[112]

In October 1965, Parkins introduced a five-year plan for the direction of *Biological Abstracts* called "Guidelines, 1966-1970."[113] This plan encompassed the purpose and future goals of BIOSIS, and is best relayed through Parkins's own words:

> It should be recognized that *Biological Abstracts,* the publication, and Biological Abstracts, the organization, have long been exerting a strong consistent force toward the synthesis of biological information and the unification of biology as a science. The many different areas and interests of biology are monitored and traditionally merged in BA as they have not yet been by any other single organization or society in this country. BA's role as a synthesizing influence and agent may well stand as a major contribution to the progress of biology.[114]
>
> BIOSIS is now providing life scientists with the greatest number of access routes to the world's largest and most comprehensive body of bioscience information through its chief publication, *Biological Abstracts,* and its current subject and several special indexes, and the most recent publication, *BioResearch Titles.* The ultimate goal, however, is to achieve an even more flexible, more dynamic, fully integrated information system capable of responding rapidly and effectively to the many different and ever changing research and teaching needs of the biological community.[115]

The last sentence, which expressed the drive to fully automate the BIOSIS production system, defines the Parkins era at BIOSIS. In 1965, BIOSIS purchased its first computer, an IBM 1440, and began "mechanizing." The same year, Parkins demonstrated her forward-thinking nature with the establishment of a Research and Development department headed by Systems Development Director Louise Shultz.[116]

The need to digitize BIOSIS's extensive publications was pressing. In 1965, between its 24 indexed issues and the first four issues of *BioResearch Titles, BA* publications from that year alone occupied 3 feet of shelf space and weighed 79 pounds—in an unbound state. Bound, the publications were even larger and heavier.[117] The number of abstracts and indexes contained by *BA* was only growing. In 1957, *BA* indexed 50,000 articles; in 1967, they indexed more than

[112] Tomezsko, *Fully Occupied Years*, 78.
[113] Steere, *Biological Abstracts/BIOSIS*, 127.
[114] Steere, *Biological Abstracts/BIOSIS*, 127.
[115] Steere, *Biological Abstracts/BIOSIS*, 127.
[116] Tomezsko, *Fully Occupied Years*, 86.
[117] Phyllis V. Parkins, "Biosciences Information Service of Biological Abstracts," *Science* 152, no. 3724 (May 13, 1966): 889.

200,000 articles.[118] The system Parkins envisioned was "a storage and retrieval system which will deliver small, highly specific packages" at an affordable price.[119] It would "integrate all operations: acquisition, bibliographic checking, processing, storage, retrieval, and dissemination of information for all publications and services of BA."[120]

With the advent of online searching, BIOSIS, under the leadership of Parkins, developed two systems to assist them in the querying of their database by outside users (See Figure 16 for an example). Recognizing the need to have these systems tested prior to launching commercially, BIOSIS selected the North Carolina Science and Technology Research Center (NC/STRC, established in 1964) to collaborate on their research, a proposal which they quickly accepted.[121] NC/STRC was selected as the pilot tester because of their long-standing expertise in computerized literature searching in general, as well as for their past experience utilizing BIOSIS databases in particular. NC/STRC, a section of the Division of Natural and Economic Resources of the State of North Carolina, and one of six Industrial Application Centers of the National Aeronautics and Space Administration (NASA), often performed searches on a range of databases in response to inquiries from clients, who were primarily industrial firms, research institutes, universities, and governmental agencies such as NASA.[122]

In addition to her technological goals, Parkins also focused on leading BIOSIS into its first period of financial success. Prior to Parkins's directorship, "the company's financial problems stemmed from its reliance on outside funding," which was very unreliable. Parkins was insistent that *BA* no longer have to rely on external financiers. She raised the subscription price of *BA* to cover the entire cost of production.[123] Between 1965 and 1968, the company's revenue far exceeded its expenditures, leading to their nonprofit status being called into question, but not revoked, in 1968.[124]

At its most financially sound and with big plans for digitization, BIOSIS once again outgrew its home. In 1966, BIOSIS purchased the building at 2100 Arch Street and completely renovated the building over the next two years while gradually moving in.[125] When the move was complete in 1968, BIOSIS had room for a growing staff and designated spaces for each department. The offset typing operations had long been located off site in leased buildings in Knoxville, Tennessee and Reading, Pennsylvania due to a lack of space at the Walnut Street location. By 1970, all typing operations were performed in the new BIOSIS building at 2100 Arch Street.[126] The building had editorial space, a library, and of course, a room dedicated to the mainframe of a

[118] Louise Schultz, "New Developments in Biological Indexing and Abstracting," *Library Trends* 16, no. 3 (Winter 1968): 338.
[119] Tomezsko, *Fully Occupied Years*, 93.
[120] Tomezsko, *Fully Occupied Years*, 86.
[121] Nees and Green, "The BIOSIS Data Base," 4-5.
[122] Nees and Green, "The BIOSIS Data Base," 1-2.
[123] The exact cost of the subscription was not uncovered by research.
[124] Tomezsko, *Fully Occupied Years*, 89.
[125] Steere, *Biological Abstracts/BIOSIS*, 178.
[126] Steere, *Biological Abstracts/BIOSIS*, 180.

new IBM 30 computer (Figure 18).[127] The new building also had conference rooms and large meeting rooms that would allow for the gathering and collaboration of scientists and information scientists and facilitate new ideas in the field. The general plan of these spaces remains today (See Maps 5-11).[128]

The building at 2100 Arch Street allowed BIOSIS to make great strides in digitizing, or "mechanizing" their products. In 1969, BIOSIS replaced their IBM 30 with and IBM 40 computer. The same year BIOSIS was able to offer the first nonprint product in its history, called *BA Previews*. It was distributed on magnetic tape and was available on a lease basis.[129] The name would later change to *BIOSIS Previews* in 1975 because it contained information beyond the scope of *Biological Abstracts*.[130] *BIOSIS Previews* combined journal content from *BA* with supplemental, non-journal coverage *from Biological Abstracts*/RRM (Reports, Reviews, Meetings).

Meanwhile, the BIOSIS Research and Development department was making great strides on Parkins' goal to create "a storage and retrieval system which will deliver small, highly specific packages."[131] In 1968, Systems Development Director Louise Schultz, in a journal targeted to students in the information sciences, explained the indexing techniques BIOSIS employed that made their abstracts more easily searchable than periodicals publishing in other scientific fields.[132] Most search systems were restricted by a narrow vocabulary of search terms; BIOSIS had more flexible search parameters and developed a guide "to the vocabulary of the biological literature, both to help the individual using the published indexes and as the basis for the machine index to the total machine file."[133] Schultz lauded the benefits of BIOSIS's computerized indexes, writing:

> Relieved of mechanical bottlenecks to document management, they are improving the ease and consistency with which the individual can select from the most comprehensive biological data base those items of particular interest in his professional work.[134]

BIOSIS's volume of publications continued increasing so much that in 1972, the company began publishing *BA* in two volumes of 12 issues per year compared to its usual one volume of 24 issues.[135] BIOSIS replaced their Model 40 IBM with an IBM 370/145, tripling storage capacity.[136] It allowed data entry typists to view their work on remote video display terminals

[127] Steere, *Biological Abstracts/BIOSIS*, 9.
[128] Steere, *Biological Abstracts/BIOSIS*, 180.
[129] Freeman, "Growth and Change," 71.
[130] Freeman, "Growth and Change," 71.
[131] Tomezsko, *Fully Occupied Years*, 97.
[132] Schultz, "New Developments in Biological Indexing and Abstracting," 343.
[133] Schultz, "New Developments in Biological Indexing and Abstracting," 348.
[134] Schultz, "New Developments in Biological Indexing and Abstracting," 351.
[135] Tomezsko, *Fully Occupied Years*, 91.
[136] Tomezsko, *Fully Occupied Years*, 92.

that connected to the larger mainframe, and it allowed the company to automatically generate all of its printed products into cumulative indexes.[137]

As a result of overlapping efforts in the fields of biochemistry and physiology, BIOSIS and Chemical Abstracts agreed in 1972 to enter a cooperative systems program. This meant the coordination of indexing practices and the interconnecting of the indexes, allowing for much of the duplication amongst the two services to be eliminated, making it easier for researchers in biology and chemistry alike. The new use of the computer as a processing tool by both organizations made this coordination both technically and economically possible. The objectives of this coordination meant the development of a single index to library holdings of periodicals covered by the two services, the establishment of a common system for identifying documents, the development of compatible technology authority files, the use of the same abstracts in both services for resources previously common to both, the elimination of duplicates, coordination of indexing policies and practices, and the adoption of common processing standards and development of compatible computer-readable, microform and printed services.[138] This was a notable landmark in the field of national and international indexing and abstracting services, and provided a model for other services in the future.[139]

The BIOSIS board promoted Parkins to Executive Director in 1973, once again the first woman to occupy this position at the company. Dr. H.E. Kennedy, who joined BIOSIS in 1967 as Assistant Director for Scientific Affairs, was figured as her successor and named Deputy Executive Director. When Parkins retired in 1975, she had led BIOSIS into the digital age and had achieved many of the goals she laid out in "Guidelines, 1966-1970."[140] Though it was not yet "fully mechanized," as Parkins hoped, BIOSIS made great strides during the Parkins era and would continue advancing under H.E. Kennedy's leadership.[141]

THE KENNEDY ERA, 1975-1993

The BIOSIS board named Dr. H. Edward Kennedy Executive Director of BIOSIS on November 1, 1975, shortly before the company celebrated its 50th anniversary.[142] This was just six months before William Campbell Steere published *Biological Abstracts/BIOSIS: The First Fifty Years* to mark the anniversary.[143] Steere wrote:

> Kennedy has taken over the helm of an organization that is vastly different from the Biological Abstracts of thirty, twenty, or even ten years ago (when it became

[137] Tomezsko, *Fully Occupied Years*, 92.
[138] Steere, *Biological Abstracts/BIOSIS*, 196.
[139] Steere, *Biological Abstracts/BIOSIS*, 196.
[140] Tomezsko, *Fully Occupied Years*, 96.
[141] Tomezsko, *Fully Occupied Years*, 98.
[142] Steere, *Biological Abstracts/BIOSIS*, 11.
[143] Steere, *Biological Abstracts/BIOSIS*, 160.

> BIOSIS), as a result of the growth of the literature, many technological advances, and creative and imaginative leadership, especially in the more recent past. [144]

Steere attested that Kennedy had big shoes to fill in the wake of the "creative and imaginative leadership" of Phyllis Parkins but felt confident that Kennedy would continue leading BIOSIS forward as "a competent and forceful leader."[145] His optimism was not misplaced. The Kennedy era was a time of growth and prosperity for BIOSIS. When interviewed by Steere for *Biological Abstracts/BIOSIS: The First Fifty Years,* Kennedy outlined his goals for BIOSIS's next chapter. Kennedy planned to shift BIOSIS to two-way interactive databases, and to utilize new technology and practices including:

> Direct online input of data from the primary editor or author, machine indexing to a much greater extent, and editors working on-line before video terminals with editing carried out by electronic sensing devices rather than by keyboarding.[146]

The first few years of Kennedy's leadership showed how much BIOSIS had grown since its early days. The implementation of a "Project to Redesign and Re-engineer the BIOSIS System" began in 1975 with the change of leadership. The project was initially supported by the National Science Foundation, moving towards the goal of creating an integrated database of all the services BIOSIS had available. The new system allowed for the total photocomposition of *BioResearch Index*, which was integrated in January 1976, and *Biological Abstracts* which was integrated later on in the same year.[147] Between 1975 and 1976, BIOSIS also became commercially available for online searching utilizing Lockheed's DIALOG system, the world's first commercial online information retrieval service, which had only become available in 1972.[148]

The Kennedy era was not perfect; it was marked by employee dissatisfaction and labor unrest. BIOSIS originally attracted biologists seeking an alternative to working in a lab or in academia by BIOSIS tabling at career fair events targeted to recent graduates to recruit staff.[149] However, by 1976, non-biologists were the clear majority everywhere but in the editorial department, where the actual abstracts were written. [150] There was a disconnect between scientists and non-scientists. BIOSIS was appealing to many because it offered regular hours and a steady income. Unfortunately, it also offered low salaries and limited opportunities for career advancement.[151] In 1976, employees launched an attempt to unionize, which failed when the employee vote did not pass.[152] Employee dissatisfaction plagued BIOSIS leadership for the remainder of its existence.

[144] Steere, *Biological Abstracts/BIOSIS,* 160.
[145] Steere, *Biological Abstracts/BIOSIS,* 166.
[146] Steere, *Biological Abstracts/BIOSIS,* 166.
[147] Steere, *Biological Abstracts/BIOSIS,* 11.
[148] Nees and Green, "The BIOSIS Data Base," 1.
[149] "For small firms, it's fair game," *The Philadelphia Inquirer,* December 30, 1987, 27.
[150] Tomezsko, *Fully Occupied Years,* 102.
[151] Tomezsko, *Fully Occupied Years,* 104.
[152] Tomezsko, *Fully Occupied Years,* 105.

Despite this, the number of BIOSIS employees continued to grow throughout the 1980s. In 1979, 2100 Arch Street housed 228 employees, and in 1990, the staff size at BIOSIS reached its peak at 400 employees. It would only decline after.[153]

In 1977, BIOSIS published its three millionth abstract and had an operating budget of $5.5 million compared to a $50,000 budget at its nadir in 1938.[154] In 1978, 262,000 new items were added to the BIOSIS database, with 275,000 planned for 1979. Over 100 countries contributed to the new literature.[155] With this influx of literature alongside new technology, BIOSIS's modern capabilities were becoming of interest to many organizations. Some research facilities experimented with using hardwired systems to connect to the BIOSIS database. In the mid-to-late 1970s, the North Carolina Science and Technology facility at Research Triangle Park was hardwired to the BIOSIS computer in Philadelphia.[156] In North Carolina, the research team utilized an IBM 3284 printer to receive and print information at their research center. Though the printer was slow, information was also provided on a screen. STRATBLDR, developed by BIOSIS personnel to assist in interactive querying of their database, was designed to assist with BIOSIS search strategy preparation. The BIOSIS database was becoming more and more accessible to researchers and students alike.[157]

By 1979, BIOSIS was experiencing another type of growth as well: once again, the staff and operations had outgrown their home. Kennedy knew that BIOSIS could not achieve his future goals for the company without adequate space to house their operations, especially considering the new interest in digital access.[158] Consulting architecture and planning firm Wallace, McHarg, Roberts, and Todd (WRT), Kennedy elected to build an addition to the existing facilities at 2100 Arch Street that would double the size of the building. Construction lasted from 1980-1982. The resulting addition was a boon to BIOSIS; it provided the company with space to expand its editorial space and literature collection space. It also allowed space for BIOSIS to install a new IBM 4341 computer in 1982, just after the addition was opened, and add a second IBM 4341 computer in 1986.[159] The addition gave BIOSIS room to grow and advance in the 1980s and early 1990s, leaving the top three floors unoccupied, which were projected to be needed by 1992 to accommodate their growth. In 1983, BIOSIS published its four millionth abstract and in 1987, its five millionth.[160]

During the 1980s, the Research and Development Department began using personal computers (PCs) and floppy disks. The benefit of these systems was indefinite storage, something that a typewriter and paper storage did not provide.[161] In 1982, BIOSIS announced a new product, the BIOSIS Information Transfer System (BITS). Introduced in 1985, BITS provided the

[153] Tomezsko, *Fully Occupied Years*, 118.
[154] Tomezsko, *Fully Occupied Years*, 115.
[155] Steere, *Biological Abstracts/BIOSIS*, 129.
[156] Nees and Green, "The BIOSIS Data Base," 4.
[157] Nees and Green, "The BIOSIS Data Base," 4-5.
[158] Wallace, et al, "Projections and Requirement for Future Expansion," 6-8.
[159] Tomezsko, *Fully Occupied Years*, 117.
[160] Tomezsko, *Fully Occupied Years*, 117.
[161] Tomezsko, *Fully Occupied Years*, 116.

opportunity to request certain references rather than an entire issue at a price corresponding to the volume of the request.[162] BITS was designed for microcomputer operating systems and utilized 8" floppy disk drives. Subscribers developed a research profile drawn from over six-hundred subject categories and received a monthly diskette containing selected modified references drawn from the BIOSIS/Previews database. The service was provided based on a permanent, loyalty free license, meaning that the subscriber could browse, search, and modify records, add in-house indexing terms, and delete records that weren't relevant to the subscriber's particular research focus/use. The newly created profile would be submitted to BIOSIS staff who would review it for accuracy and estimate the number of items that would result from their selections and then provide an updated invoice. Launching BITS was considered to be a pioneering achievement in increasing computer literacy, which had just begun to impact the general public with the introduction and popularization of microcomputer in the 1970s and 1980s. BIOSIS leapt at the chance to accommodate those with these inexpensive "microcomputers".[163] BITS won several awards among online industry groups for this advancement in accessibility.[164]

In 1988, BIOSIS was "the world's largest life science abstracting, indexing, and access service" publishing not only *Biological Abstracts*, but also "over 100 other life science information publications"[165] That year, over half a million references had been added. The total number of searchable online items exceeded six million, which was approximately three-quarters of all BIOSIS records produced since 1926, bringing BIOSIS into one of their most significant eras.[166]

In the late 1980s, BIOSIS contributed significantly to research during the AIDS epidemic. [167] The literature related to AIDS presented a challenge at this point in history. With an unprecedented influx of literature and research responding to the AIDS epidemic, indexing and abstracting companies struggled to keep up. The information, though quickly growing, was not yet easily accessible to researchers through indexing databases. With a mass of new literature suddenly available in the wake of the early years of the AIDS epidemic, bibliographic publications had yet to catch up. The literature was scattered among numerous journals because it was related to many disciplines. The closest related bibliographic information available during the early years of the epidemic was through Index Medicus, a competitor of BIOSIS, under the heading Immunologic Deficiency Syndromes, published in 1970.[168] Publications under this heading were related to immune diseases, but included more than those just related to AIDS. The term AIDS had yet to be used across the field of medicine and science, making it even more difficult to research during this critical period in history. Not until 1982 did AIDS become

[162] Tomezsko, *Fully Occupied Years*, 117.
[163] Kathlyn L. Reed, "Citation Analysis of Faculty Publication: Beyond Science Citation Index and Social Science Citation Index," *Bulletin of the Medical Library Associates* 83, no. 4 (October 1995): 503-508.
[164] Tomezsko, *Fully Occupied Years*, 117.
[165] Kennedy, "BIOSIS to the Rescue," 309-310.
[166] Anne Cowie and Pauline Duckitt, "The BIOSIS® Perspective on AIDS Research," *Health Libraries Review* 5, no. 3 (1988): 160-168.
[167] Cowie and Duckitt, "The BIOSIS® Perspective on AIDS Research,"160-168.
[168] Sarat Roberts, Louise Shepherd, and Jenny Wade, "The Scientific and Clinical Literature of AIDS: Development, Bibliographic Control and Retrieval," *Health Libraries Review* 4, no. 4 (1987): 197–218.

officially identified as a new disease, and not until 1983 that the name "acquired immune deficiency syndrome" was used in an indexing and abstracting service, first published by Index Medica's Medical Subject Headings (MeSH).[169]

Two initiatives in 1983 marked the start of a response to the growing challenges of the quickly expanding AIDS literature. Competing databases that initially provided information on AIDS research journals include Medline, Bioethicsline, Cancerlit, and Catline. MeSH increased the number of papers indexed by 75 percent in 1984 and continued to expand in the following two years. The literature was also being indexed and abstracted via other bibliographic tools such as Excerpta Medica and Survey of Research of Sexually Transmitted Diseases, however Index Medica remained the most accessible and up-to-date general source.[170]

By 1985, however, there was a clear need for specialist publications in the field of AIDS research. The United Kingdom was first to react with the production of an abstracting bulletin published by the Oncology Information Services.[171] In the United States, the BIOSIS database extended their coverage of literature into the area of AIDS-specific research within their commercially related online database publication *BioBusiness*. BIOSIS introduced *BioBusiness* in 1985 to provide information on the commercial and industrial applications of research and development in the life sciences.[172] It was intended for professionals such as business executives, marketing specialists, financial analysts, attorneys, legislators, and information specialists requiring life science information. Major areas of coverage included biotechnology and bioengineering, pharmaceuticals, energy and the environment, agriculture, cosmetics, and food and beverages. Items were selected from a broad spectrum of life-science, business and management publications. By the end of 1987, *BioBusiness* had over 104,000 records on subjects with a combined life sciences and commercial focus. These provided information on discoveries, products, sciences, and commercial focus.[173]

From the overall BIOSIS database two additional specialist printed information services on AIDS were produced, including *The Collected Papers on AIDS Research* and *AIDS Research Today.* Also utilized for AIDS research was a new type of information service that linked past and present research findings on specific topics, entitled *The BIOSIS Perspective Series.*[174] By 1987, the level of demand, which was already high, increased again following public awareness campaigns. BIOSIS responded by publishing *Collected Papers of AIDS Research* and the *AIDS Bibliography*. It became a major retrospective bibliography contributing to the field.[175] *The Collected Papers on AIDS Research*, which was developed between 1976 and 1986, included over 4,500 items, 34 percent with abstracts. The publication was supplemented by *AIDS Research Today*, which came out in 1987.[176] Between 1981 and 1987, the number of references

[169] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 200.
[170] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 200.
[171] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 200.
[172] Cowie and Duckitt, "The BIOSIS® Perspective on AIDS Research," 166-167.
[173] Cowie and Duckitt, "The BIOSIS® Perspective on AIDS Research," 166-167.
[174] Cowie and Duckitt, "The BIOSIS® Perspective on AIDS Research," 166.
[175] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 198-200.
[176] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 198-200.

to AIDS in the BIOSIS Previews database went from two diseases and eight viruses to 1,576 diseases and 995 viruses.[177] AIDS research tools within BIOSIS Previews were particularly valuable in comparison to other services because they covered the period before 1981 when the first description of AIDS as a recognizable entity was published, allowing for the early period of the AIDS research to be accounted for alongside the rapidly growing new literature.[178]

The Kennedy era greatly expanded BIOSIS's international presence. In 1980, BIOSIS acquired the Zoological Society of London after their indexing system had amassed three years' worth of backlog; BIOSIS was then able to catch the Society up using its automated system.[179] BIOSIS assumed financial responsibility for the society's publication, *Zoological Record,* while the society retained editorial control.[180] As part of this endeavor, BIOSIS established a subsidiary, BIOSIS UK, that had an office in York, England. BIOSIS also expanded the amount of foreign literature it abstracted.[181]

BIOSIS Previews, which covered the years of 1970 to the current date, was hosted by DATA-STAR, DIALOG, and BRS, leading hosts at this time. BIOSIS Previews continued to serve all of the life sciences, with a particular focus in the biomedical area.[182] Between 1987 and 1989, a total of 1,551,000 records were added to BIOSIS Previews.[183] At the beginning of 1990, a new CD-ROM version of *BA, Biological Abstracts on Compact Disc* (BA on CD) was introduced. In the early 1990s, BIOSIS embraced widespread use of PCs across departments.[184] Local Area Networks (LANs) allowed the sharing of information between PCs in the office.[185] Also in the early 1990s, BIOSIS launched new online retrieval systems and offered courses on how to perform online searches to public users.[186] By the time of Kennedy's retirement in 1993, BIOSIS employed multiple full-time translators to abstract articles written by foreign biologists, especially articles written in Russin, French, or German.[187]

The financial situation at the end of the Kennedy era was troublesome. BIOSIS built its success on embracing modern technology, but modern technology also beget its decline. Though BIOSIS adapted to the digital age, they continued to make most of their income with paper products which, in 1992, comprised two-thirds of revenue. People simply were not buying paper products when digital alternatives existed. Though sales decreased, costs continued to mount to finance BIOSIS's digital work: In 1990, expenses exceeded revenue by almost $1 million.[188] By the time

[177] Cowie and Duckitt, "The BIOSIS® Perspective on AIDS Research," 164.
[178] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 198.
[179] Tomzsko, *Fully Occupied Years,* 114.
[180] Tomezsko, *Fully Occupied Years*, 114.
[181] "Translator," *The Philadelphia Inquirer,* January 9, 1993, 115.
[182] Roberts, et al., "The Scientific and Clinical Literature of AIDS," 204.
[183] E. Hodas, M. O'Hearn, and M. Kelly, "BIOSIS as an Agricultural Information Resource," In *New Horizons in Agricultural Information Management. Proceedings of an International Symposium, March 13-16, 1991, Beijing, China,* ed. Gary K. McCone (Ottawa, Ontario: The International Development Research Center, May 1991). 400.
[184] Tomezsko, *Fully Occupied Years*, 117.
[185] Tomezsko, *Fully Occupied Years*, 117.
[186] Tomezsko, *Fully Occupied Years*, 122.
[187] "Translator," *The Philadelphia Inquirer,* 115.
[188] Tomezsko, *Fully Occupied Years*, 124.

H. Edward Kennedy retired in 1993, his leadership saw BIOSIS achieve Phyllis V. Parkins's goal to fully mechanize all systems.[189] And yet, that great success of the Kennedy era was tempered by the decline in sales that only worsened in the 1990s, ultimately resulting in their acquisition by Reuters.

DECLINE AND LEGACY – THE MODERN ERA

When John Anderson became executive director of BIOSIS in 1993, he was inheriting a business beginning to descend from its peak.[190] Though BIOSIS continued to technologically advance in the 1990s, low revenue due to the failure to fully keep up with an ever-digitizing system of scientific information led to mass layoffs. BIOSIS also began outsourcing work to the Philippines. In 1997, Anderson stated, "Globally, BIOSIS, by growing at the rate of inflation, has shifted its industry position from a respected midsized secondary publisher to that of a small player in a specialty field."[191]

Figure 19: BIOSIS Advertisement. (Source: *Nature Biotechnology Journal*, 11 March 1993, 260.)

[189] Tomezsko, *Fully Occupied Years*, 99.
[190] Tomezsko, *Fully Occupied Years*, 133.
[191] Tomezsko, *Fully Occupied Years*, 154.

When WRT prepared its report in 1979, they projected the growth of BIOSIS out to the year 1992. WRT also projected an operation so large that BIOSIS would occupy all floors of the addition, which they unfortunately never achieved.[192] A workforce reduction due to both low revenue and outsourcing to the Philippines combined with the use of PCs rendered the space for a mainframe superfluous. BIOSIS no longer needed the space afforded to them by the 1982 addition. In the late 1990s, BIOSIS remained the largest abstracting and indexing service for biological and biomedical research.[193] Their growth, however, no longer required large amounts of space that the building on Arch Street provided for early computers, which were beginning to grow smaller, more affordable, and more prevalent in the home. In 1999, BIOSIS sold the building to the Jewish Federation of Greater Philadelphia and moved into two floors in a building at 20th and Market streets.[194]

In 2001, BIOSIS celebrated its 75th Anniversary. Anderson publicly maintained that the company was alive and well, despite its struggles.[195] The Thomson Corporation, later called Thomson Reuters Scientific, acquired BIOSIS in 2004, allowing it to live on in a new iteration. The company, following this merger, also went on to acquire previous BIOSIS competitors, such as the Institute for Scientific Research, also headquartered in Philadelphia. In 2016, Thomas Reuters was absorbed by Onex Corporation and Private Equity Asia, becoming Clarivate.[196]

EBSCO Information Services, a popular repository for scientific scholarly research, partnered with Clarivate in 2016, and all BIOSIS's intellectual property (IP) is available on the EBSCOhost website.[197] The BIOSIS name is still used for all of the company's former IP. Thomas Scientific, Inc. kept the BIOSIS name for its database because the name was so respected, recognizable, and marketable. EBSCO offers various subscriptions including one to *Biological Abstracts* 1926-1999, the BITS system, and BIOSIS Previews. [198] EBSCOhost advertises this content as

> Easy access to the latest information from virtually every life science discipline…including agriculture, biochemistry, biology, biotechnology, botany, pharmacology, pre-clinical and experimental medicine, veterinary medicine, and zoology.[199]

The breadth of information reveals how extensive BIOSIS's work had become by the time it sold in 2004. Despite its sale, the BIOSIS legacy is readily accessible.

[192] Wallace et. al., "Projections and Requirement for Future Expansion," 132-140.
[193] Hodas, et al., "BIOSIS as an Agricultural Information Resource," 398.
[194] Carlisle, "A Multi-use History, Sown From Maule's Seeds."
[195] Tomezsko, *Fully Occupied Years*, 195.
[196] "EBSCO Information System Services and Clarivate Analytics to Make Two New Resources Available via EBSCOhost®," EBSCO, December 15, 2016. Accessed June 1, 2024. https://www.ebsco.com/news-center/press-releases/ebsco-information-services-and-clarivate-analytics-make-two-new
[197] "EBSCO Information System Services…."
[198] "Abstracting and Indexing Database: Biological Abstracts," EBSCO, Accessed June 12, 2024, https://www.ebsco.com/products/research-databases/biological-abstracts.
[199] "Abstracting and Indexing Database: Biological Abstracts."

ADDITIONAL INFORMATION – COMPETITORS

BIOSIS had few competitors in its lifetime. Those which did exist were established much later than Biological Abstracts. By the 1980s, this included the Institute for Scientific Information (est. 1956), Excerpta Medica (est. 1946), Index Medicus (est. 1879), and Information Retrieval Ltd. (est. 1966). Biomedical databases were produced by both private and public sectors and were vended by three commercial organizations. Included were Bibliographic Retrieval Services, DIALOG Information Services, Inc., and System Development Corp. At this time, however, health-related computerized bibliographic information was predominantly created and disseminated by the National Library of Medicine through MEDLARS. Their prevalence began to hinder the growth of the private information sector.[200]

The Institute for Scientific Information (ISI) was founded in Philadelphia in 1956, with their first publication of Science Citation Index (SCI) in 1964. SCI provided scientometric and bibliographic database services in the sciences, social sciences, and humanities, less particular to the life sciences than the services that BIOSIS offered.[201] Their purpose-built headquarters was constructed in 1979 and designed by Venturi, Scott Brown & Associates, however the building was substantially renovated for use as the URBN Center for the Westphal College of Media Arts & Design, Drexel in 2013.[202] In 2004, the company was acquired by the Thomson Corporation, which would go on to merge with Reuters in 2008, becoming Thomson Reuters.[203] SCI was not available online until 1997.

Excerpta Medica was founded in 1946 as an independent not-for-profit foundation with some grant support from the governments of the United States and The Netherlands. In 1971, Excerpta Medica was acquired by a private Dutch company, Elsevier-NDU, who was a major scientific publisher at the time. By the 1980s, the company was publishing two indexes of bibliographic references to drug literature, and 43 journals containing abstracts of articles published in the primary journal literature, and six core journals containing abstracts of the most recent literature in discrete clinical specialties from the 43 specialty abstract journals. Excerpta Medica provided descriptive indexes of biomedical and clinical literature. Excerpta Medica was designed by and addressed practicing physicians. They also selected, approved, modified, and in some cases rewrote abstracts. Excerpta Medica particularly covered European literature, providing English

[200] Office of Technical Assessment, Congressional Board of the 97th Congress, "MEDLARS and Health Information Policy: A Technical Memorandum," (Washington, DC: US Government Printing Office, September 1982): iii. [digitized online] Available from the Hathi Trust https://babel.hathitrust.org/cgi/pt?id=umn.31951000121909z&seq=4&q1=biosis.
[201] "Institute for Scientific Information Exterior View," Science History Institute Digital Collections, accessed July 30, 2024, https://digital.sciencehistory.org/works/4e5k2xn.
[202] John L. Puckett, "The Institute for Scientific Information," West Philadelphia Collaborative History, University of Pennsylvania, accessed July 30, 2024, https://collaborativehistory.gse.upenn.edu/media/institute-scientific-information.
[203] "The History of ISI and the Work of Eugene Garfield," Clarivate, accessed July 30, 2024, https://clarivate.com/the-institute-for-scientific-information/history-of-isi/.

abstracts as well.[204] Though this company was largely European, it provides context for the history of abstracting services in biology.

IRL Life Sciences Collection (Information Retrieval, Ltd.) was an independent, privately owned British company that provided 17 abstracting services, covering discrete areas in biological and medical sciences. Founded in 1966 with the publication of Microbiology Abstracts, the company grew steadily into the 1980s. IRL included conference proceedings, books, reports, patents, and even advertisements, announcements, and unpublished or privately published reports. IRL provided global coverage (less than 37 percent were of United States origin in 1982) and offered full abstracts in English and foreign language sources. All indexing was completed in-house by university graduates in the life sciences. IRL Abstracts included Animal Behavior, Biochemistry Abstracts, Calcified Tissue Abstracts, Ecology Abstracts, Entomology Abstracts, Genetics Abstracts, Immunology Abstracts, Microbiology Abstracts, Toxicology Abstracts, and Virology Abstracts.[205]

Index Medicus was established in 1879. Between 1879 and 1899, it ran 21 volumes. From 1903 to 1920, it ran 18 volumes. A third series was produced from 1921 to 1927. In 1927, the organization was acquired by the American Medical Association, which published it as the Quarterly Cumulative Index Medicus until 1956. In 1960, the National Library of Medicine took control of the publication, publishing it as Index Medicus/Cumulated Index Medicus. The National Library of Medicines PubMed now covers the publications that Index Medicus once provided bibliographic information on.[206] In 1971, the National Library of Medicine began providing access to Index Medicus via the MEDLARS online (now MEDLINE) system. This system provided access to medical journal citations published from 1966 and on. In 1997, PubMed was launches, allowing access to MEDLINE data through the internet instead of MEDLARS.[207] MEDLINE focused on clinical medicine, while BIOSIS provided a more in-depth and broader look at the life sciences and biology. There is a 30 percent overlap between the abstracts of BIOSIS and MEDLINE, but the two are often used in tandem by researchers.[208]

Though competitors existed during the period of BIOSIS's greatest success, few have the same longevity and relevance to the biological and life sciences in the United States. Additionally, few have covered the same level of broad topics within biology that BIOSIS has. With MEDLINE focused on clinical medicine and others were based in Europe or the United Kingdom, BIOSIS serves a particular subscriber in the United States. As is true historically, the use of multiple indexing services indeed provides the widest range of potential information and the maximum amount of indexed literature, however BIOSIS stands alone in providing access to wide array of

[204] Office of Technical Assessment, "MEDLARS and Health Information Policy," 37.
[205] Office of Technical Assessment, "MEDLARS and Health Information Policy," 38.
[206] John Mark Ockerbloom, ed., "Index Medicus," The Online Books Page, University of Pennsylvania, accessed July 30, 2024, https://onlinebooks.library.upenn.edu/webbin/serial?id=indexmedicus.
[207] "MEDLINE History," National Library of Medicine, Training Material and Manuals, last updated January 19, 2024, accessed July 30, 2024. https://www.nlm.nih.gov/medline/medline_history.html.
[208] "Research Guides: Systematic Reviews and Meta Analysis: Databases and Sources," Harvard Countway Library, accessed July 30, 2024, https://guides.library.harvard.edu/meta-analysis/databases.

information particular to the life sciences in the United States, and contributes immensely to the field of agriculture, medicine, and other biological fields.

CRITERIA CONSIDERATION G: BUILDINGS LESS THAN 50 YEARS OLD

Though the 1982 addition is not yet 50 years old, 2100 Arch Street meets Criteria Consideration G because of its **exceptional significance** as the home of BIOSIS, a pioneer in scientific information services who became the world's largest life science abstracting and indexing.[209] BIOSIS, though founded in 1927, experienced its most important period of growth during—and because of—2100 Arch Street. The success of BIOSIS is inextricably linked to the move to, and expansion of, the building through the 1982 addition during the height of their technological expansion. BIOSIS could not have continued growing and revolutionizing the abstracting and indexing of research in the scientific community without the space and technology provided by the 1982 addition, which, through its distinctly modern appearance, is itself a visual representation of the embrace of modern ideas and technology.

BIOSIS's rapid expansion and transition to digitized records in the Phyllis Parkins Era was only possible because of the company's 1966 move to 2100 Arch Street, and the company's continued exponential growth during the Kennedy Era was only possible due to the 1982 addition to the building. The 1966-1968 relocation of BIOSIS to 2100 Arch Street took place under the leadership of Phyllis V. Parkins and was invaluable in achieving the goals she set forth in "Guidelines, 1966-1970."[210] In addition to providing needed space for the company's IBM computers, the larger premises consolidated all operations under one roof. Parkins stated the building increased employee productivity and morale and allowed BIOSIS to better serve scientists and science information specialists.[211] She believed 2100 Arch Street also provided the opportunity for BIOSIS to undertake projects to help "young scientists in the art and practice of handling scientific information."[212] The building at 2100 Arch Street also provided space for an auditorium and multiple conference rooms, still extant, where other scientists and editors could meet for the sharing of ideas and progression of the field through collaboration.

Tellingly, in 1967, Phyllis Parkins remarked on the move to 2100 Arch Street:

> Although it is people, not buildings, that make effective organizations, we know also that even the most dedicated individual works more effectively in an environment appropriate to the functions he performs. We are extremely pleased, then, that our new home provides greatly improved facilities for all of our highly motivated and hard-working staff.[213]

[209] Kennedy, "BIOSIS to the Rescue." 309-310.
[210] Steere, *Biological Abstracts/BIOSIS*, 127.
[211] Steere, *Biological Abstracts/BIOSIS*, 127.
[212] Steere, *Biological Abstracts/BIOSIS*, 127.
[213] Steere, *Biological Abstracts/BIOSIS*, 178.

In the WRT study to determine BIOSIS's future expansion options, they unambiguously declared that it was "clear from this study that if BioSciences is to achieve its full growth potential, additional space will be required within two years."[214]

WRT determined that "projections of growth for the operation of BioSciences to 1992 indicate that this building cannot accommodate space requirements of projected growth in excess of ten years."[215] The 1913 building was already too small by common spatial standards in 1979, with employees working in "slightly crowded conditions."[216] Based on space requirement standards, the 1979 staff of 228 people required an area of 64,000 square feet in comparison to the building's existing area of 58,200 square feet. WRT projected that in 1980, a staff of 262 would require 69,120 square feet; in 1985, a staff of 339 staff would require 86,640 square feet; and in 1990, a staff of 414 would require 104,880 square feet.[217]

During this era, the company grew substantially. In 1982 and 1983, when the addition was newly constructed, BIOSIS utilized the new space to support substantial leaps in providing their services electronically, outlined by the introduction of the BITS service and the expeditious expansion of specific bibliographic services related to the quickly growing literature produced by an influx of research following the first major wave of the AIDS epidemic in the United States. As previously outlined, the 1980s were a period of continued growth and innovation for BIOSIS, with new lines of business, technological advances and critical dissemination of information. In 1988, BIOSIS was "the world's largest life science abstracting, indexing, and access service" publishing not only Biological Abstracts, but also "over 100 other life science information publications."[218] An entire floor of the addition housed the company's 4341 IBM computer along with a second, purchased in 1986, which was key in the digitization of abstracts and indexes and the foray into developing online search systems. Another entire floor was dedicated to editorial work, which was responsible for BIOSIS's multiple publications, both printed and digitized. Demonstrably, in 1980, before the addition, magnetic databases made up 7.7 percent of revenue, and printed products made up 84.2 percent. In 1992, at the end of the Kennedy Era, magnetic databases made up 30.6 percent of revenue, and printed products made up 67.6 percent.[219] The 1982 addition saw BIOSIS into the digital age and, as WRT asserted, BioSciences could only achieve its full growth potential through additional space.

CONCLUSION

The BIOSIS Headquarters Building at 2100 Arch Street has exceptional significance as the home of BIOSIS, a pioneer in scientific information services. To once again quote Phyllis V. Parkins, "Even the most dedicated individual works more effectively in an environment appropriate to the

[214] Wallace et al, "Projections and Requirement for Future Expansion," 6.
[215] Wallace, et al, "Proposal for Future Requirements," 1.
[216] Wallace, et al, "Proposal for Future Requirements," 1.
[217] Wallace et al, "Projections and Requirement for Future Expansion," 3.
[218] Kennedy, "BIOSIS to the Rescue." 309-310.
[219] Tomezsko, *Fully Occupied Years*, 98.

functions he performs."[220] Between 1966 and 1999, 2100 Arch Street provided an environment for BIOSIS to work effectively and expand significantly. The success of BIOSIS as the largest database publisher for the life sciences is inextricably linked to the move to and expansion of the building through the 1982 addition, which allowed BIOSIS to continue growing and revolutionizing the process and use of abstracting and indexing services in the life sciences and biology. The BIOSIS Headquarters Building ultimately helped to proliferate world-changing scientific research, housing cutting edge technology which launched BIOSIS into a new, modern era, providing an incomparable research tool to scholars, educators, and other companies and organizations alike. The BIOSIS Headquarters Building is therefore nationally significant under Criterion A in the area of COMMUNICATIONS, for its impact on the scientific community through its informational services. The space and technology afforded by the 1982 addition made this commitment to the cutting edge possible, ultimately bringing the company into its greatest period of impact and significance in the scientific community. The impacts of BIOSIS at their 2100 Arch Street location extends the period of significance to 1999 when the building at 2100 Arch Street was sold to the Jewish Federation of Greater Philadelphia.

[220] Steere, *Biological Abstracts/BIOSIS*, 178.

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Previous documentation on file (NPS):

_x__ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
_____previously determined eligible by the National Register
_____designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #_____
_____recorded by Historic American Engineering Record # _____
____ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

____ State Historic Preservation Office
____ Other State agency
____ Federal agency
____ Local government
____ University
____ Other
Name of repository: _____

Historic Resources Survey Number (if assigned): _N/A_____

10. Geographical Data

Acreage of Property __0.35_____

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)

1. Latitude: 39.95583 Longitude: -75.17524

2. Latitude: 39.95577 Longitude: -75.17473

3. Latitude: 39.95545 Longitude: -75.17480

4. Latitude: 39.95553 Longitude: -75.17531

Verbal Boundary Description (Describe the boundaries of the property.)

The boundary is the legal parcel (#772636525), as depicted in Map 3.

BEGINNING at a corner formed by the intersection of the Southerly side of Arch Street 172 feet wide and the Westerly side of 21st Street (50 feet wide) in the 8th Ward, former part of the 9thWard of the City of Philadelphia; thence extending Westwardly along the Southerly side of Arch Street. South 78 degrees 58minutes 00 seconds West, a distance of 140.00 feet to a point; thence extending Southwardly along a line at right angles to arch Street and through a party wall, South 11 degrees 02 minutes 00 seconds East, a distance of 108.667 feet to a point on the Northerly side of Walden Street (26 feet wide); thence extending Eastwardly along the said side of Walden Street North 78degrees 58 minutes 00 seconds East a distance of 139.350 feet to its intersection with the Westerly line of 21st Street; thence extending Northwardly along the Westerly line of said 21st Street. North 10 degrees 42 minutes 00 seconds West, a distance of 108.667 feet to the point of BEGINNING.

Boundary Justification (Explain why the boundaries were selected.)

The boundaries encompass the parcel of the resource, which includes all land and buildings historically associated with the BIOSIS headquarters between 1966 and 1999.

---

11. Form Prepared By

name/title: Nika Faulkner/Charlotte Adams
organization: Heritage Consulting Group
street & number: 15 W. Highland Ave
city or town: Philadelphia state: PA zip code: 19118
email: projects@heritage-consulting.com, nfaulkner@heritage-consulting.com
telephone: (215)248-1260
date: January 2025

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.

- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.

- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: BIOSIS Headquarters Building

City or Vicinity: Philadelphia

County: Philadelphia State: PA

Photographer: Nick Kraus

Date Photographed: June 2024

Description of Photograph(s) and number, include description of view indicating direction of camera:

1 of 21 (PA_PhiladelphiaCounty_BIOSIS_001): Exterior, North Elevation, view looking southeast.

2 of 21 (PA_PhiladelphiaCounty_BIOSIS_002): Exterior, North Elevation, view looking south.

3 of 21 (PA_PhiladelphiaCounty_BIOSIS_003): Exterior, North Elevation, view looking south.

4 of 21 (PA_PhiladelphiaCounty_BIOSIS_004): Exterior, North Elevation, view looking southwest.

5 of 21 (PA_PhiladelphiaCounty_BIOSIS_005): Exterior, North Elevation, view looking south.

6 of 21 (PA_PhiladelphiaCounty_BIOSIS_006): Exterior, East and North Elevations, view looking southwest.

7 of 21 (PA_PhiladelphiaCounty_BIOSIS_007): Exterior, East Elevation, view looking southwest.

8 of 21 (PA_PhiladelphiaCounty_BIOSIS_008): Exterior, Southeast Corner, view looking southwest.

9 of 21 (PA_PhiladelphiaCounty_BIOSIS_009): Exterior, South Elevation, view looking northwest.

10 of 21 (PA_PhiladelphiaCounty_BIOSIS_010): Exterior, South Elevation, view looking northeast.

11 of 21 (PA_PhiladelphiaCounty_BIOSIS_011): Interior, First Floor, Lobby, view looking southeast.

12 of 21 (PA_PhiladelphiaCounty_BIOSIS_012): Interior, First Floor, Stairwell, view looking west.

13 of 21 (PA_PhiladelphiaCounty_BIOSIS_013): Interior, First Floor, Vestibule, view looking southwest.

14 of 21 (PA_PhiladelphiaCounty_BIOSIS_014): Interior, First Floor, Lobby, view looking west.

15 of 21 (PA_PhiladelphiaCounty_BIOSIS_015): Interior, First Floor, view looking northwest.

16 of 21 (PA_PhiladelphiaCounty_BIOSIS_016): Second Floor, Elevator Lobby Mezzanine view looking east.

17 of 21 (PA_PhiladelphiaCounty_BIOSIS_017): Interior, Second Floor, view looking northwest.

18 of 21 (PA_PhiladelphiaCounty_BIOSIS_018): Interior, Fourth Floor, view looking northeast.

19 of 21 (PA_PhiladelphiaCounty_BIOSIS_019): Interior, Sixth Floor, Stairwell, view looking northeast.

20 of 21 (PA_PhiladelphiaCounty_BIOSIS_020): Interior, Eighth Floor, Elevator Lobby, view looking east.

21 of 21 (PA_PhiladelphiaCounty_BIOSIS_021): Interior, Basement, Stairwell, view looking northwest.

Figures

Figure 1 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_001): 1929 photo showing 2100 Arch Street, constructed 1913 for Maule's Seed. (Source: City of Philadelphia, Department of Records)

Figure 2 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_002): UPenn Zoology Department Building, Home of Biological Abstracts 1926-1946. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 54.*)*

Figure 3 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_003): 3613 Locust Street (shown at right), Home of Biological Abstracts 1946-1950. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 169.)

Figure 4 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_004): 3815 Walnut Street, Left-Hand Unit Home of Biological Abstracts 1950-1960. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 170.)

Figure 5 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_005): 3815 Walnut Street after Renovation, Both Sides Home of Biological Abstracts 1960- 1967. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 172.)

Figure 6 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_006): 1968 diagram showing the BIOSIS search system created by Louise Schultz. (Source: *New Developments in Biological Indexing and Abstracting,* 347.)

Figure 7 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_007): 2100 Arch Street, Home of Maule's Seeds 1913-1924, Home of BIOSIS 1967-1999. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* iii.)

Figure 8 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_008): 1966 photo showing 2100 Arch Street prior to BIOSIS 1966-1968 renovation. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 175.)

Figure 9 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_009): Circa 1970 photo showing the main entrance after the BIOSIS 1966-1968 renovation of 2100 Arch Street, and prior to the construction of the 1982 addition. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years.* 176.)

Figure 10 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_010): Circa 1975 photo showing the editorial space after the BIOSIS 1966-1968 renovation of 2100 Arch Street. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 178.)

Figure 11 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_011): Circa 1975 photo showing tape drives in the computer room after the BIOSIS 1966-1968 renovation of 2100 Arch Street. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 154.)

Figure 12 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_012): Circa 1975 photo showing Keypunch machines at 2100 Arch Street. (Source: Steere, Biological Abstracts/BIOSIS: The First Fifty Years, 150.)

Figure 13 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_013): Chart showing publication growth of *Biological Abstracts* from 1927-1974. (Source: Steere, *Biological Abstracts/ BIOSIS: The First Fifty Years,* 144.)

Figure 14 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_014): A 1975 Chart showing the company organization of BIOSIS. (Source: Steere, *Biological Abstracts/BIOSIS: The First Fifty Years*, 164.)

Figure 15 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_015): Rendering of 2100 Arch Street with 1982 Addition, Home to BIOSIS 1982-1999. (Source: *Fully Occupied Years: The Rise and Fall of a Company Called BIOSIS*, 83.)

Figure 16 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_016): WRT Plan for the proposed eight-story addition to 2100 Arch Street. (Source: *Projections and Requirement for Future Expansion*, 8.)

Figure 17 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_017): A 1982 advertisement for the unoccupied upper floors of the 2100 Arch Street addition. (Source: *Philadelphia Inquirer, September 15, 1982*, 78.)

Figure 18 of 18 (PA_PhiladelphiaCounty_BIOSIS_Fig_018): IBM 4341 Computer (Source: Ca. 1970s IBM 4341 Brochure) IBM Field Engineering Division, IBM 4341 Processor (White Plains, NY: International Business Machine Corporation, ca. 1974, 3. https://bitsavers.trailing-edge.com/pdf/ibm/brochures/IBM4341Processor.pdf.

Figure 19 of 19: BIOSIS Advertisement. (Source: Nature Biotechnology Journal, 11 March 1993, 260.)

Maps

Map 1 (PA_PhiladelphiaCounty_BIOSIS_Map_001): Locational Map showing the Biosis Headquarters Building in Philadelphia. Note the Schuylkill River to the west, and downtown Center City to the east. (Base Map Source: Google)

Map 2 (PA_PhiladelphiaCounty_BIOSIS_Map_003): Site Map showing the construction dates of the original 1913 building and then 1982 Addition. (Base Map Source: Google)

Additional Documentation

Map 3 (PA_PhiladelphiaCounty_BIOSIS_Map_003): Parcel Map with Coordinates (Base Map Source: City of Philadelphia Atlas, https://atlas.phila.gov/2100-12%20ARCH%20ST/property)

Map 4 (PA_PhiladelphiaCounty_BIOSIS_Map_005): Map 5: Exterior Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Google)

Map 5 (PA_PhiladelphiaCounty_BIOSIS_Map_006): First Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

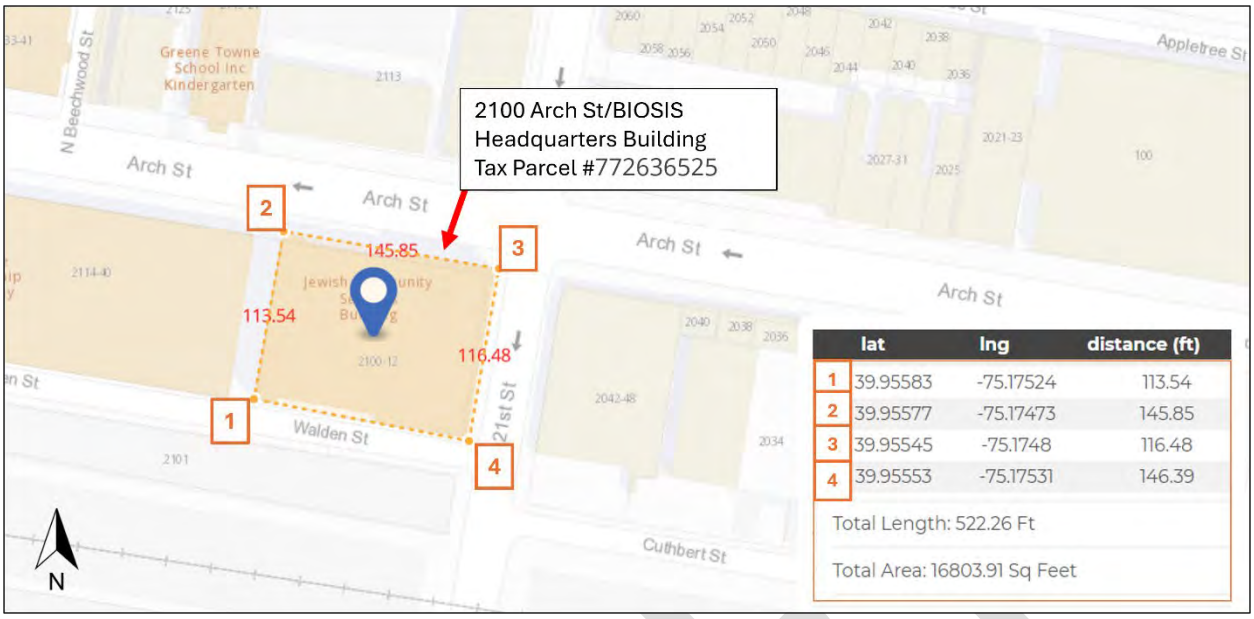
Map 6 (PA_PhiladelphiaCounty_BIOSIS_Map_007): Second Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Map 7 (PA_PhiladelphiaCounty_BIOSIS_Map_008): Fourth Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Map 8 (PA_PhiladelphiaCounty_BIOSIS_Map_009): Sixth Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Map 9 (PA_PhiladelphiaCounty_BIOSIS_Map_010): Eight Floor Photo Key Map. Plans generally reflect the current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Map 10 (PA_PhiladelphiaCounty_BIOSIS_Map_011): Basement Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

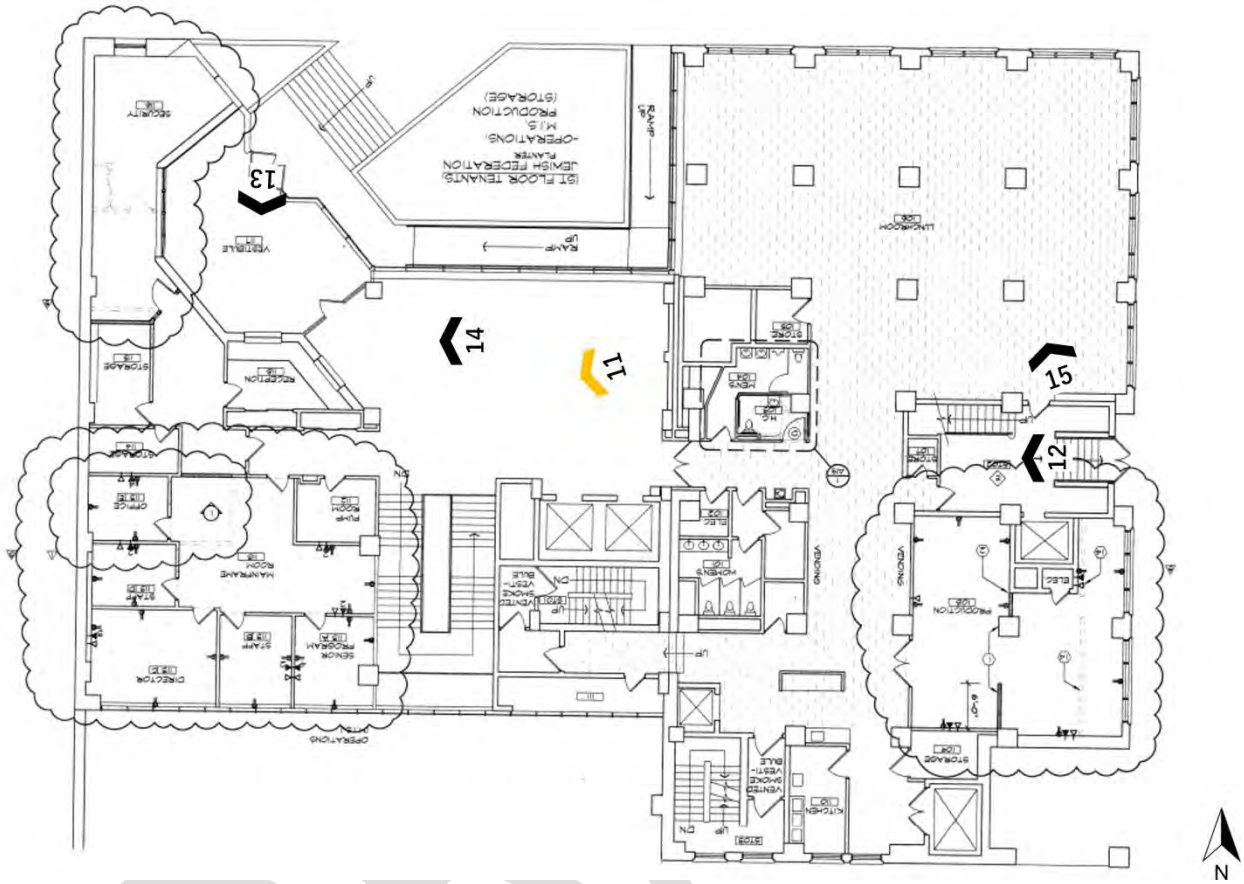


Map 3: Parcel Map with Coordinates (Base Map Source: City of Philadelphia Atlas, https://atlas.phila.gov/2100-12%20ARCH%20ST/property)

Exterior
Photos 1 – 10
Yellow arrow indicates starting point

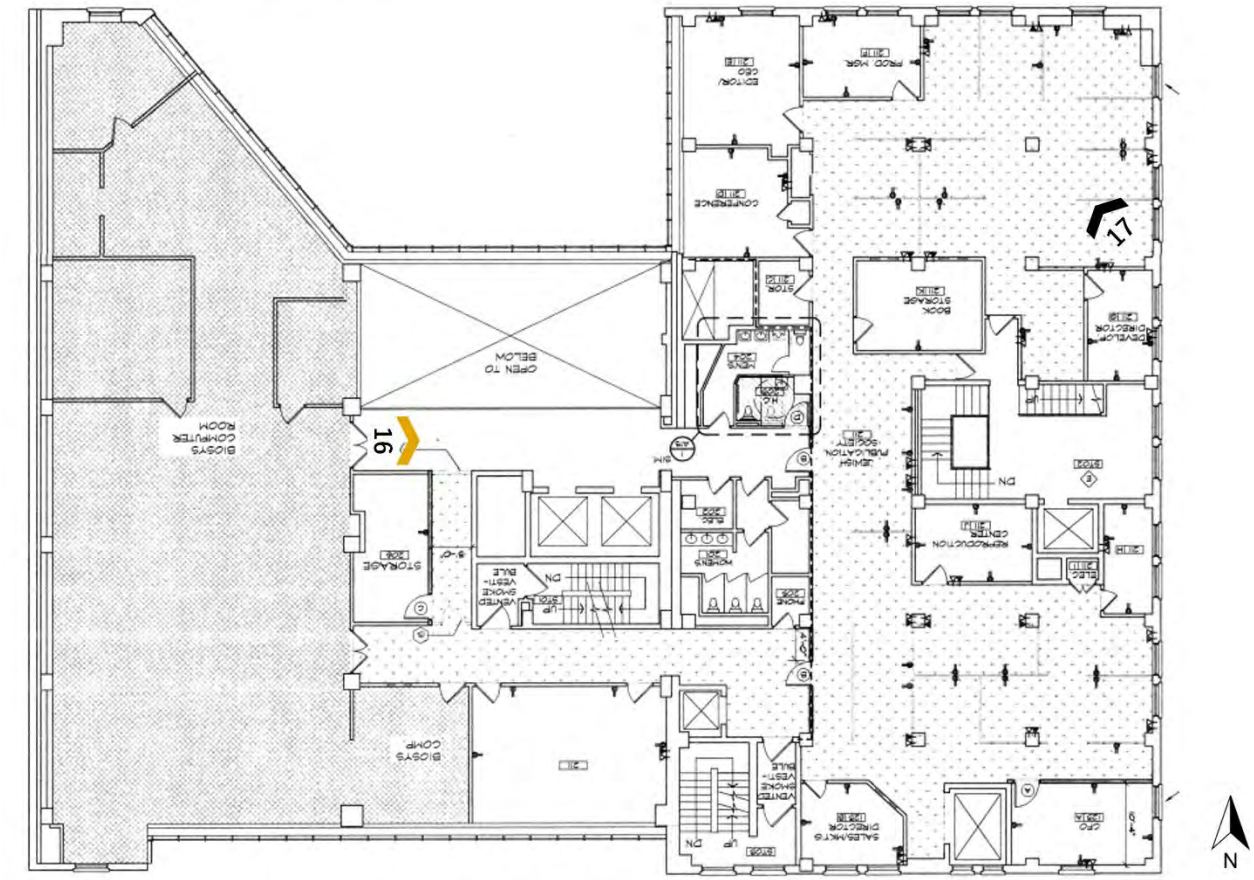
Map 4: Exterior Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Google)

First Floor
Photos 11-15
Yellow arrow indicates starting point



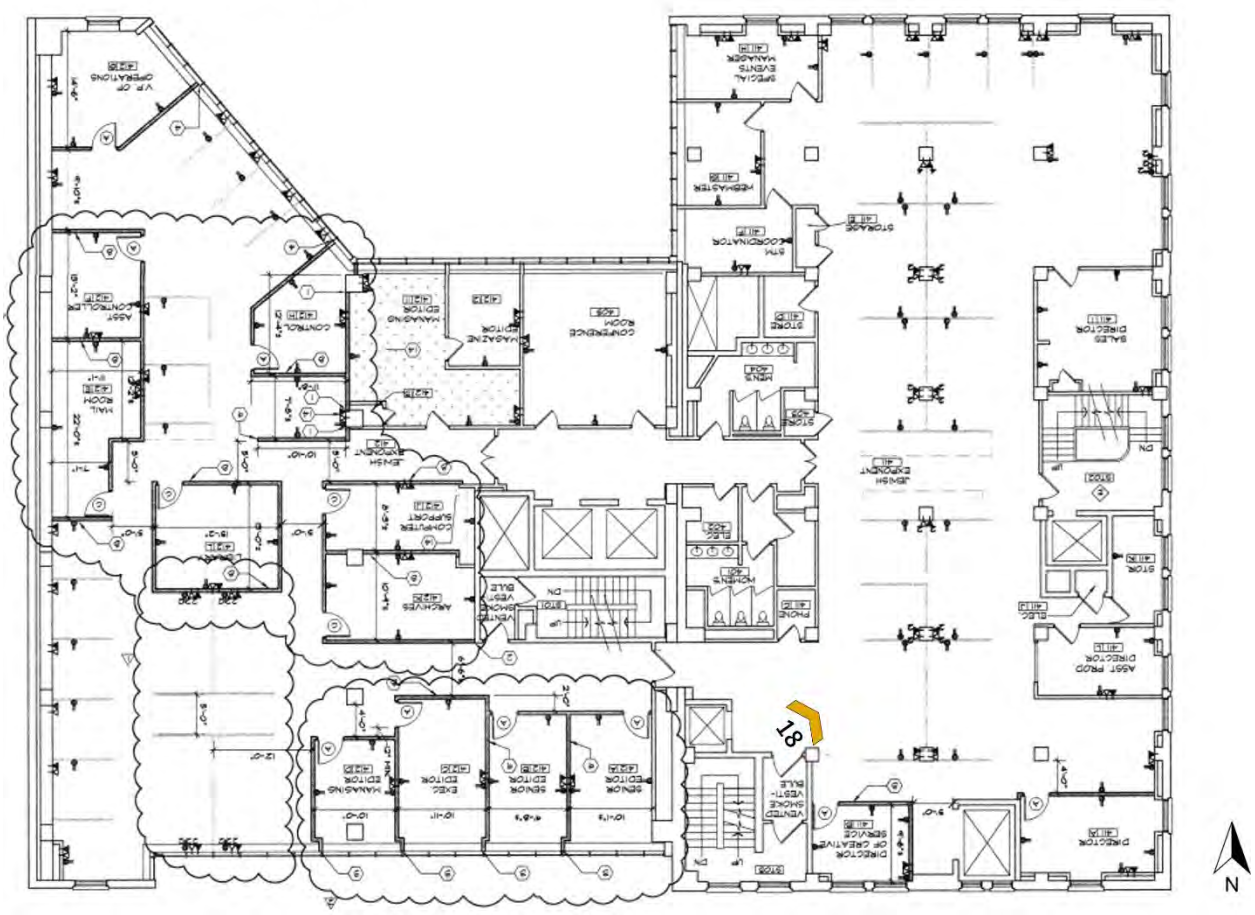
Map 5: First Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Second Floor
Photos 16-18
Yellow arrow indicates starting point



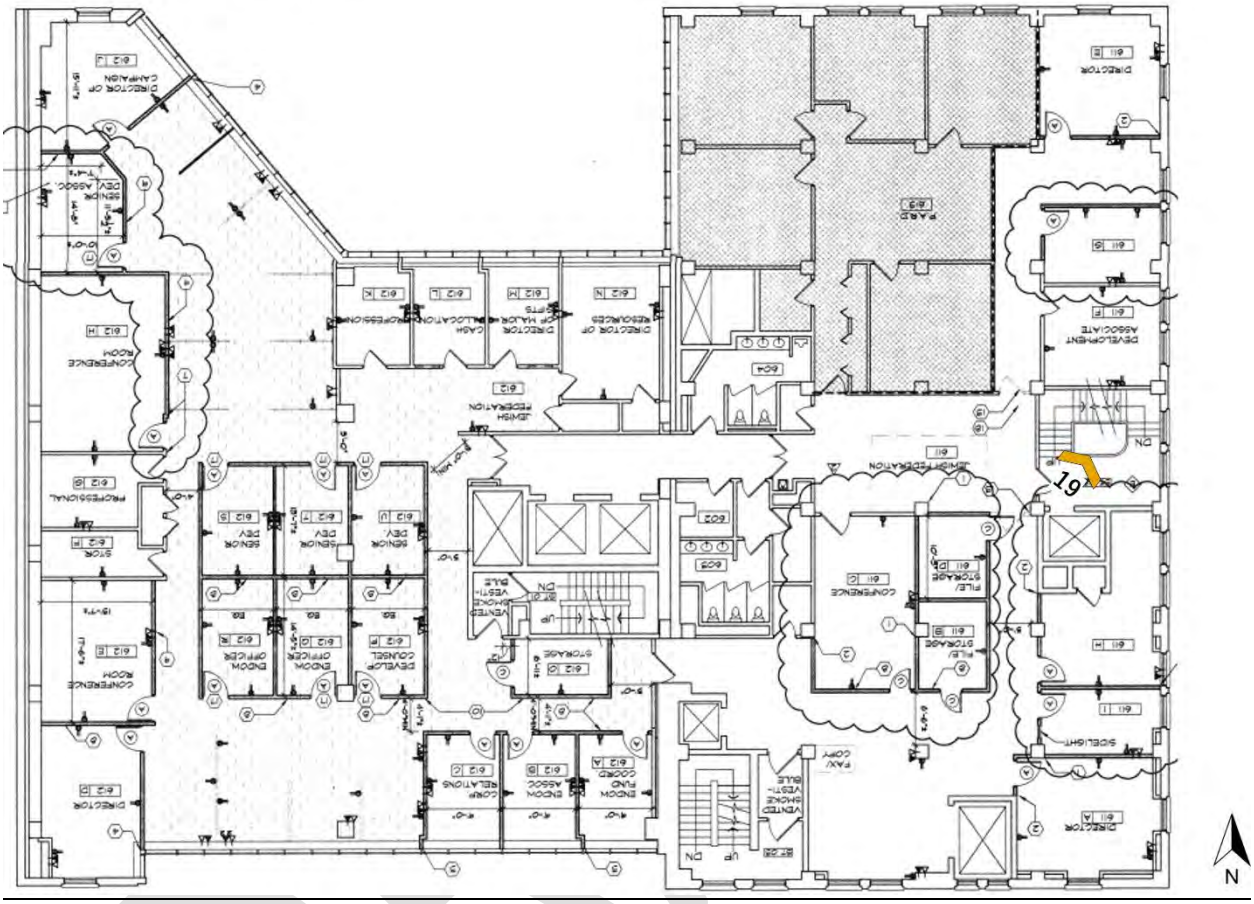
Map 6: Second Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Fourth Floor
Photos 18
Yellow arrow indicates starting point



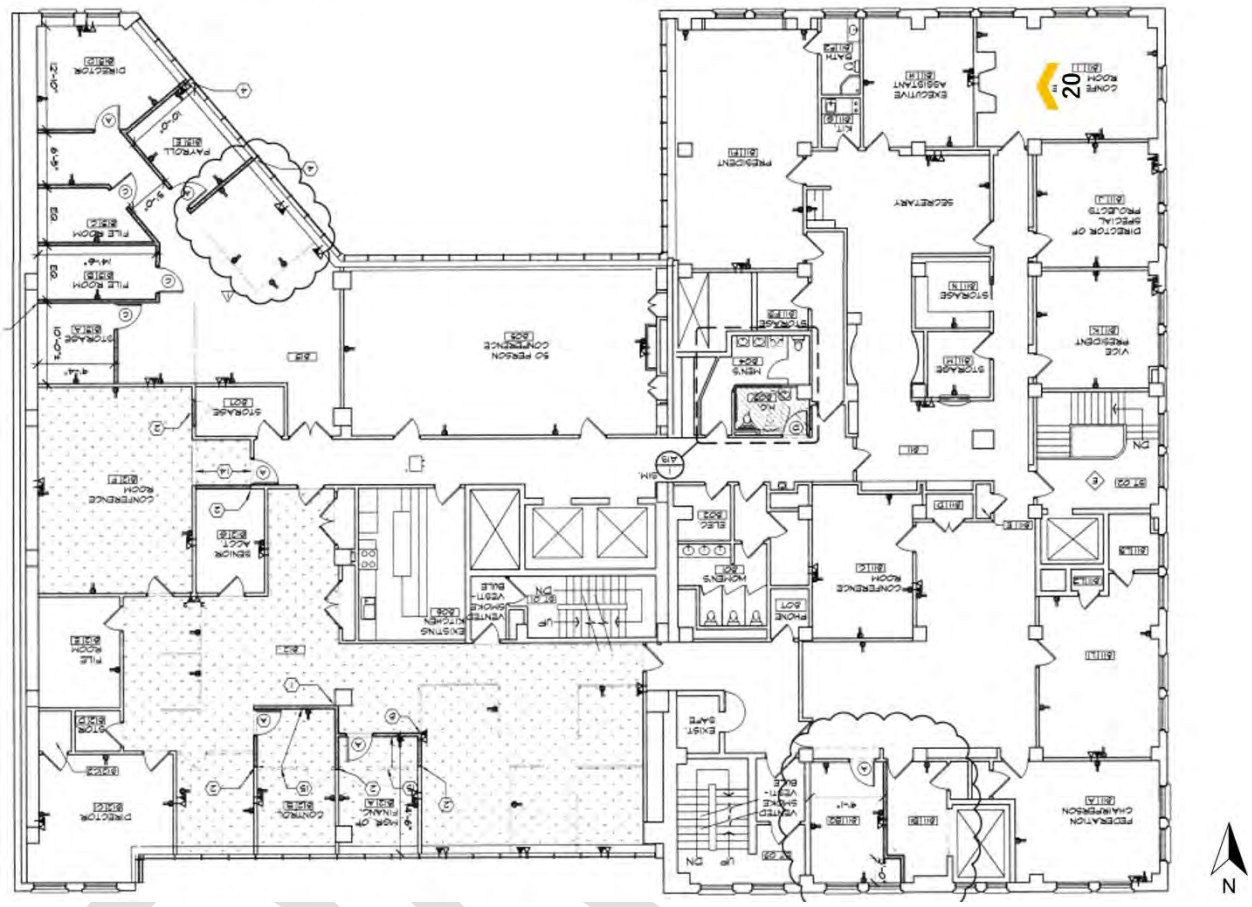
Map 7: Fourth Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Sixth Floor
Photo 19
Yellow arrow indicates starting point



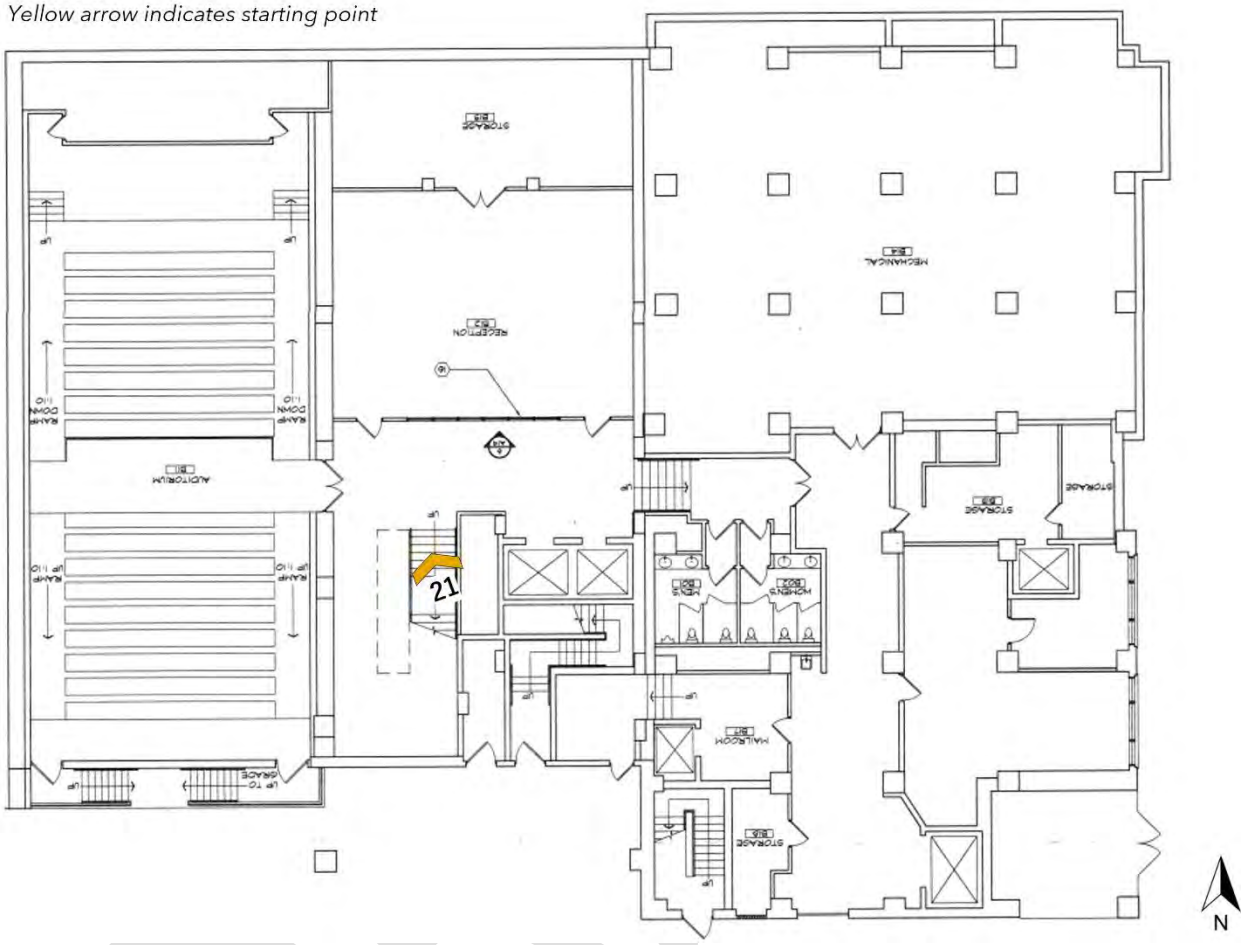
Map 8: Sixth Floor Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Eighth Floor
Photos 20
Yellow arrow indicates starting point



Map 2: Eight Floor Photo Key Map. Plans generally reflect the current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Basement
Photos 21
Yellow arrow indicates starting point



Map 10: Basement Photo Key Map. Plans generally reflect current conditions. (Base Map Source: Jewish Community Services Building Plans, JK Roller Architects, 1999.)

Paperwork Reduction Act Statement: This information is being collected for nominations to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.). We may not conduct or sponsor and you are not required to respond to a collection of information unless it displays a currently valid OMB control number.
Estimated Burden Statement: Public reporting burden for each response using this form is estimated to be between the Tier 1 and Tier 4 levels with the estimate of the time for each tier as follows:

Tier 1 – 60-100 hours
Tier 2 – 120 hours
Tier 3 – 230 hours
Tier 4 – 280 hours

The above estimates include time for reviewing instructions, gathering and maintaining data, and preparing and transmitting nominations. Send comments regarding these estimates or any other aspect of the requirement(s) to the Service Information Collection Clearance Officer, National Park Service, 1201 Oakridge Drive Fort Collins, CO 80525.