

Art and Rare Materials BIBFRAME Ontology Extension version 1.0

Implementation Guidelines

Acknowledgements

The Society of American Archivists (SAA), the Art Libraries Society of North America (ARLIS), and the Rare Books and Manuscripts Section of the Association of College and Research Libraries (RBMS) formed the ARM BIBFRAME Extension task force in 2019 to revise and develop an extension to BIBFRAME focused on rare materials consisting of the following members:

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Links to Related Documents

Version 1.0 (latest): <https://github.com/Art-and-Rare-Materials-BF-Ext/arm/tree/master/v1.0>

Version 0.1 (deprecated): <https://github.com/Art-and-Rare-Materials-BF-Ext/arm/tree/master/v0.1>

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Background

Released March 2021, the Art & Rare Materials BIBFRAME Ontology Extension (ARM) [version 1.0](#) replaces version 0.1. While version 0.1 is now considered deprecated, files associated with that version remain live in the [GitHub repository](#).

ARM 1.0 was developed as a partnership between the [ARLIS Cataloging Advisory Committee](#), the [RBMS Bibliographic Standards Committee](#) and the [SAA Standards Committee](#). Official adoption by the archival, art, and rare materials communities will be determined individually by each organization. Further, these organizations will determine their roles in development of ARM beyond version 1.0; as of March 2021, no commitment has been determined by these organizations.

ARM is not itself a full ontology; instead, ARM is intended to facilitate description of collection-level archival information, art objects, and rare materials by other ontologies used in bibliographic description, notably the [BIBFRAME Ontology](#). That said, the classes, properties, and typing vocabularies are not restricted to implementations that use BIBFRAME as their core modeling.

Select models within ARM may be considered separable from the core models, amenable to independent implementation by users within and outside the bibliographic domain. These include the Award, Measurement, and Event classes. Documentation for each of these classes may be found below.

Major differences : v0.1 and v1.0

Deprecated the Activity Model; implemented BIBFRAME Contribution Model

In ARM v0.1, the arm:Activity model was created for the association between resources and their respective agents. The model treated this association as an Activity and deviated substantially from the BIBFRAME Contribution model. In developing ARM 1.0, the arm:Activity model was deprecated in order to eliminate this deviation in core modeling. As such, ARM is implementable more easily with a core ontology (BIBFRAME as one example). In our implementation guidelines and examples, we assume the use of bf:Contribution; however, a community using a different core model for associating agents with resources can substitute their modeling.

Introduced arm:hasType

ARM v0.1 relied heavily on subclassing for distinguishing types across individuals of a Class (e.g.: arm:LimitationNote was created to provide a noteType identifiable as a Limitation Note). This causes significant heft to the ontology extension while also restricting flexibility for

implementers to deviate from the use cases envisioned by the editors of the ontology. As such, ARM v1.0 defined `arm:hasType`, transitioned to more generic classes and relies on the use of `arm:hasType` to declare typing for those classes.

Introduced Generic Events

In reviewing custodial history, conservation history, and exhibitions, ARM v1.0 wished to simplify these concepts into a more generic `arm:ItemHistory` with `arm:Event` used for the various actions that are part of that `arm:ItemHistory`. Each `arm:Event` can be typed using `arm:hasType`, thus affording the ability to both community-define and locally-define vocabularies that can specify the type of `arm:Event` being used (e.g.: Exhibition, Sale, etc.). `arm:ItemHistory` is subclassed as `arm:ExhibitionHistory`, `arm:ConservationHistory`, `arm:CustodialHistory` to afford more granularity if an implementing institution wishes for this distinction. While an implementor is not required to group various `arm:Event` instances within `arm:ItemHistory` or its subclasses, the ARM Editorial Group believes that this will allow for easier querying.

Merged ontology files

In ARM v0.1, four OWL ontology files were created: Activities, Award, Core, Custodial History and Measurement. This was due to a belief that implementations that may benefit from one aspect of ARM but not another may benefit from separate files. As ARM v1.0 was created, two of these files were deprecated for other modeling (Activities and Custodial History) as described above. The remaining files were merged to allow for simpler navigation and use of ARM by implementers.

Note Subclassing versus Typing

ARM 0.1 defined ten subclasses of `bf>Note` (e.g.: `arm:InaccuracyNote` and `arm:LimitationsNote`). To allow for more flexibility and ensure consistency-of-approach across the ontology, ARM 1.0 deprecated the subclasses of `bf>Note` and introduced a Note Types Vocabulary intended for use with the `arm:hasType` property. This allows ARM implementers to define the type of note provided without being limited by the strictness of subclassing. ARM did not adopt `bf:noteType` for two reasons: 1. `bf:noteType` is a `dataProperty` and therefore likely to create far too inconsistent data for future querying; and, 2. ARM believes that no individual class needs its own specified type property. Implementations will understand that the Subject of `arm:hasType` relates to the Resource to which the property is connected.

Vocabularies

Internal

ARM vocabularies are designed to cover specific descriptive needs currently not addressed in BIBFRAME or other existing ontologies. While a number of terms were created in ARM v0.1, many were deprecated in v1.0 as referenced above. Notably, all of the contributor terms (e.g.,

artist, binder, engraver) associated with the Activity model have been deprecated from the main ontology in favor of using `bf:Contribution` which pairs an agent with a specific role. Some of these agent roles not available in the LC MARC Code List for Relators (<https://id.loc.gov/vocabulary/relators.html>) have been temporarily minted in the ARM namespace until they are added to national vocabulary lists. This vocabulary is available here: <https://art-and-rare-materials-bf-ext.github.io/arm/v1.0/vocabularies/relator.rdf>. Other deprecated terms include two types of handwriting used in a resource (e.g., mixed hand, other hand), as it was determined that the two terms provided are insufficient for describing various handwriting types found in manuscripts. Hence, building a more comprehensive handwriting type terms should be considered in the future, as well as reviewing other areas for expansion (e.g., Typeface).

Updated Vocabularies

In ARM v1.0, a number of terms were updated to improve the definitions and/or editorial notes to clarify meaning and scope (e.g., Enclosure, Inscription, Marking). In some instances, additional subclasses were added to classes to accommodate current use cases (e.g., Annotation, Marginalia, and Bookplate added to Marking). Some classes were entirely renamed to mitigate confusion with existing concepts (e.g., Arrangement changed to PhysicalPresentation). A total of 14 new note types were added to be used with `arm:hasType` property as a result of deprecating the subclasses of `bf:Note` as referenced above. For a comprehensive list of line-item changes, see [changelog](#) created in GitHub.

Recommended External

ARM classes and properties can be extended to apply in other contexts or used with other ontologies. Some of the external thesauri to consider are:

- [Art & Architecture Thesaurus](#): Vocabularies from domains of visual arts
- [id.loc.gov](#): Library of Congress authority headings
- [Ligatus](#): Language of bindings
- [PREMIS 3](#): International standard for metadata to support the preservation of digital objects
- [RDA Unconstrained Properties](#): Resource Description & Access properties that are independent of the LRM model
- [Schema.org](#): A structured data markup schema supported by major search engines
- Controlled vocabularies from the ALA Rare Books and Manuscripts Section (RBMS) are not currently available as linked data.

Modeling Areas

Accession Number

Accession numbers are an important identifier for cultural heritage institutions to record and track an object in their collections. These numbers are also useful in the provenance of an object.

Note: In June 2021 the Library of Congress accepted a proposal made by the ARM Ontology Group and introduced bf:AccessionNumber. arm:AccessionNumber was deprecated at that point.

Example

```
:item a bf:Item ;
    bf:identifiedBy [
        a bf:AccessionNumber ;
        rdf:value "2017.001.004" ;
        arm:hasSource <http://id.loc.gov/rwo/agents/n80087582> ;
        bf:status arm:invalid ;
        bf:date "2017"
    ] .
```

Attribution

The attribution of a work to a specific creator is an important concept in art cataloging. An attribution can be defined as the activity of "ascribing a work to a particular artist or school of artists" [\[AAT\]](#). This attribution may change over time as new research becomes available.

The ARM ontology addresses this with an object property (arm:hasAttribution) and a class (arm:Attribution). Necessary information such as dates of the attribution, agent responsible for making the attribution, and/or the source on which this attribution is based can be associated directly with this Attribution node. Complex information that cannot easily be expressed in structured form should be recorded in a bf:Note.

In the MARC 21 standard this has so far been handled by adding subfield j (attribution qualifier) to the 1xx field in the bibliographic record. The MARC Relator Terms contain "Attributed name" (<http://id.loc.gov/vocabulary/relators/att>) for use in this subfield. However, attributions behave somewhat differently from other relators such as artist or author since a source for the relationship is shared in addition to the attribution itself.

Example

```
:work1 a bf:Work ;
    bf:contribution :contribution1 .

:contribution1 a bf:Contribution ;
    bf:agent :agent1 ;
    bf:role :role1 .

:role1 a bf:Role ;
    rdfs:label "Artist" ;
    arm:hasAttribution :attribution1 .
```

```

:Attribution1 a arm:Attribution ;
  bf:agent :attributor1 ;
  bf:date "2017" ;
  arm:hasSource :source1 ;
  bf:note :note1 .

:note1 a bf>Note ;
  rdf:value "Some text about the attribution" .

```

Awards

Many artists, artworks or art related publications represented in our library collections are recipients of awards. An award could be given to a creator for a specific work (in which case the award would need to be associated with that work) or it could be a career achievement award that can only be associated with the agent, but not with a specific work. In BIBFRAME a property `bf:awards` is available. However, `bf:awards` is a datatype property and therefore carries the MARC practice forward to record related information in a text string. It does currently not allow for linking out to awards, for example in Wikidata (e.g. Sobey Art Award) ([*<https://www.wikidata.org/wiki/Q7549952>](<https://www.wikidata.org/wiki/Q7549952>)). The BIBFRAME ontology contains a note referring to the ARM Ontology “for strategies to model this information in greater detail.”

While the awards model was developed specifically to address the descriptive needs of bibliographic items in the art and rare materials domains, we define it as an independent model with the expectation that it could be useful in the description of awards related to a broad range of resources.

Classes:

- `arm:AwardReceipt`
- `arm:AwardWinner`
- `arm:AwardShortlist`
- `arm:AwardHonoraryMention`
- `arm:AwardNominee`
- `arm:AwardCitation`
- `arm:AwardLonglist`

Properties:

- `arm:receives`
- `arm:receivedBy`
- `arm:hasAward`
- `arm:isAwardOf`

Relevant/Suggested Classes from other namespaces:

- `vivo:Award`

bf:Contribution
bf:Role

Relevant/Suggested Properties from other namespaces :

bf:contribution
bf:date
bf:agent
bf:role

Example:

```
:chatterton a bf:Work ;  
    Arm:receives :awardReceipt1 .  
  
:awardReceipt1 a arm:AwardReceipt, arm:AwardShortlist ;  
    arm:hasAward :award1 ;  
    arm:receivedBy :chatterton ;  
    bf:date "1987" .  
  
:award1 a vivo:Award ;  
    rdfs:label "Man Booker Prize" .
```

Bibliographic citations

Rare materials catalogers often cite reference sources listed in the [Standard Citation Forms \(SCF\) database](#) to support the description and identification of particular items or editions. SCF entries can be thought of as authority records for individual reference sources, but they do not currently provide canonical work-level URIs for those sources. Sources are typically cited using a controlled string that identifies the source--for example, "Wing, D.G. Short-title catalogue of books printed in England, Scotland, Ireland, Wales, and British America, and of English books printed in other countries, 1641-1700 (2nd ed. 1994)"-- often accompanied by a value that describes the location within the source where the item or edition being cataloged is referenced. Users must be able to query on both the reference source and the specific location of an entry within the source.

Additionally, there is a need to represent "negative citations": catalogers may cite a reference source in order to indicate that the item being cataloged is not listed in standard sources.

In total, there are four use cases modeled:

1. A citation is found, and the cataloger does not add commentary on the citation.
2. A citation is found, and the cataloger adds commentary on the citation.
3. A citation is not found, and the cataloger does not add commentary.
4. A citation is not found, and the cataloger adds further commentary about the reference source or a related citation.

Whenever there is a need to include dates, identifiers, and other data related to citations, the implementer should follow the general modeling practices of the core ontology (e.g.: BIBFRAME).

To address these four use cases, arm:Citation represents bibliographic citation entities; a citation functions as an intermediate node between a reference source, and a resource of interest to the cataloger (typically a bf:Item or bf:Instance). A citation is related to a resource of interest by the property arm:hasCitation (inverse arm:isCitationOf) and to the citing work by the property arm:hasSource (inverse ex:isSourceOf). A citation may link directly to its source, or it may link indirectly to the source through a specific location via arm:Entry, arm:Page and arm:Volume.

Classes

arm:Citation
arm:Entry
arm:Page
arm:Volume
arm:PreferredCitation

Properties

arm:hasCitation
arm:isCitationOf

Example:

```
:Work1 a bf:Work ;  
    arm:hasCitation :Citation1 .  
  
:Citation1 a arm:Citation ;  
    rdfs:label "Ricci, S. de. Census of medieval and Renaissance  
    manuscripts in the United States and Canada, no. 117." .
```

Bindings

By intent, BIBFRAME does not provide deep modeling of resource components or physical description; these areas are left to domain extensions. There is consequently no modeling of bindings in BIBFRAME.

Most of the ARM Binding model relies on terms from other ontologies: BIBFRAME, DCMI Terms, other ARM models, and controlled vocabularies for types and parts of bindings. The terms specific to this model are the Binding class itself and the class hierarchy in which it is positioned.

Bindings can be attached to both Instances (as issued) and Items. Bindings can also be Works in their own right. Bindings that are also Works do not need any specific modeling other than that provided by general Work models.

The Binding class is defined within a class hierarchy of enclosures. The superclass, Enclosure, should be typed to taxonomies such as AAT or other appropriate vocabularies, with predicate arm:hasType. It has been noted that Bindings, unlike the other subtypes, are not ordinarily removable (that is, only in the process of conservation or other institutional activity, rather than by ordinary users), but, though we do allow for removal of a binding from one item and subsequent attachment to another (see Many-to-Many Item-to-Binding relationships), we have as yet seen no need to make a formal distinction between removable and non-removable enclosures within the ontology. We also define here three additional classes representing parts of bibliographic resources, Mount and two subclasses, Frame and Pedestal. No specific modeling is provided for these types at this time, and we expect them to generally profile with bindings.

The Binding model connects to the BIBFRAME Contribution model and three other ARM models: Markings, Materials, Physical condition and conservation.

In May 2021, LC minted a binding note type; this is not used in ARM 1.0; need for using the binding note type may be considered in the future.

Style/period/technique/instrument are areas that relate to bindings but are not binding-specific. See the Style and Period recommendation for more information.

Classes:

arm:Enclosure
arm:Binding
arm:Frame
arm:Mount
arm:Pedestal
arm:TextBlock

Properties

arm:hasType
bf:material

Properties from other namespaces:

bf:agent
bf:agentOf
bf:date
bf:note
bf:hasPart
bf:partOf

Vocabularies/Taxonomies:

The following vocabularies will be used in modeling Enclosure and Binding types and components. The implementation of these vocabularies is illustrated in the Binding Diagram and Sample RDF.

- RBMS Binding Terms
- AAT Bindings and Binding Components
- Ligatus Language of Bindings

Example:

```
:item a bf:Item ;
bf:hasPart :binding ;

:binding a arm:Binding ;
bf:contribution a bf:Contribution ;
bf:role <http://id.loc.gov/vocabulary/relators/bnd> ;
bf:agent <http://id.loc.gov/authorities/names/nr94036784> .
bf:material :material ;
    bf:hasPart <http://vocab.getty.edu/aat/300202819> ;
    bf:note :note .

:note a bf:Note ;
    rdf:value "Pictorial, with gold, brown, and green stamping" .
```

Item with multiple bindings:

```
:item a bf:Item ;
    bf:hasPart :binding1 , :binding2 .

:binding1 a arm:Binding ;
    bf:contribution1 a bf:Contribution;
    bf:role <http://id.loc.gov/vocabulary/relators/bnd> ;
    bf:agent <http://id.loc.gov/authorities/names/nr94036784>;
    bf:material :material ;
    bf:note :note1 .

:note1 a bf:Note ;
    rdf:value "Original binding. Pictorial, with gold, brown, and
green stamping." .

:binding2 a arm:Binding ;
    bf:contribution2 a bf:Contribution;
    bf:role <http://id.loc.gov/vocabulary/relators/bnd> ;
    bf:agent <http://id.loc.gov/authorities/names/nr94036784>;
    bf:material :material2 ;
    bf:hasPart <http://vocab.getty.edu/aat/300202819> ;
    bf:note :note2 .
```

```
:note2 a bf:Note ;  
    rdf:value "Gold-tooled, over paper boards; gold-tooled spine with  
five raised bands; gilt edges; gold roll on edges of boards; mar
```

Binding attached to multiple items:

```
:item1 a bf:Item ;  
    bf:hasPart :binding .  
  
:item2 a bf:Item ;  
    bf:hasPart :binding .
```

Carriers and Bound-withs

Describing individual items that share a carrier poses a variety of challenges. In the case of bound-withs (also called sammelbands/sammelbände or composite volumes), where individual publication that has been bound into a single physical unit is described separately, information related to the volume as a whole is generally included in the description of the first item. This situation creates a need to describe such resources both individually and as a whole.

An individual resource in a bound-with may have its own particular custodial history, distinct from the other resources, while the fully bound volume may also have a custodial history that should be noted. Statements about the volume itself, such as binding information and table of contents, should not be attached to a single unit from the volume but to the volume itself. This model allows for such description, although it can be used with resources beyond bound-withs (such as resources that comprise items created or produced separately but later unified into a single physical object, such as scrapbooks or photograph albums). For published resources, only items that have been bound together subsequent to publication, rather than reissued together by the publisher (i.e., nonce collections), are covered in this model.

Not all carriers are considered collections in the way bound-withs are, however. In the case of two paintings on a single sheet, for example, one may wish to describe the individual paintings, but the sheet would not constitute a “collection” and likely does not need its own description.

BIBFRAME `bf:carrier/bf:Carrier` cannot be applied in this model because they are used for instance- rather than item-level description. In addition, `bf:carrier` indicates the type of carrier (“categorization reflecting the format of the storage medium and housing of a carrier”), not a relationship between resources on a carrier and the carrier.

Note that the relationships among the parts of a bound-with or items that share a carrier can be derived from the relationships of the parts to the whole, and it would therefore be redundant to define predicates for the part-part relationships.

This model can be connected to other ARM models, such as Markings and Bindings, through both the BoundCollection class and the Items.

Classes:

arm:BoundCollection

Properties

arm:hasType

bf:material

arm:isOnCarrier (object property)

arm:carries (object property)

Classes from other namespaces:

bf:Item

bf:Instance

bf:Identifier

bf>Title

Properties from other namespaces:

bf:hasPart

bf:partOf

seq:precedes

seq:directlyPrecedes

seq:follows

seq:directlyFollows

Examples

- Use bf:PartOf/bf:hasPart to aggregate bound-withs and similar collections on a single carrier
- Use seq:follows and seq:precedes predicates to indicate order for bound-withs or other shared-carrier collections where order is important

Bound-with

```
:item1 a bf:Item ;  
      bf:hasPart :boundCollection .  
  
:item2 a bf:Item ;  
      bf:partOf :boundCollection ;  
      seq:follows :item1 .  
  
:boundCollection a arm:BoundCollection , bf:Item ;
```

```
bf:hasPart :binding ;  
arm:markedBy :marking .
```

- The carrier model proposes linking items directly to their carriers, and deriving relationships between the individual items via their shared relationship to the same carrier. To prevent the unnecessary proliferation of carrier classes, we recommend using `arm:hasType` to specify a specific carrier from a controlled vocabulary, such as the RDA carrier terms.

Artworks on a sheet

```
:artwork1 a bf:Item ;  
    bf:itemOf :instance1 ;  
    arm:isOnCarrier :carrier1 .  
  
:artwork2 a bf:Item ;  
    bf:itemOf :instance2 ;  
    arm:isOnCarrier :carrier1 .  
  
:carrier1 arm:hasType <http://vocab.getty.edu/aat/300014671> .
```

Events

This class is meant to provide a mechanism to provide granular documentation of events on resources. This class is designed to match modeling from other namespaces familiar to the Art, Archives, and Rare Books community, such as PREMIS and PROV, that include an event class, and incorporates assumptions of descriptive standards such as DACS that assume this level of provenance tracing. These events might include conservation activities, exhibits, provenance information, and physical conditions. Implementers conversely may choose to record this type of information in already-existing properties in the ARM ontology or in BIBFRAME itself.

The model is purposely flexible in order to accommodate local functional requirements and use cases. For properties in the core ontology that are event-based such as binding, etc., implementers may provide a string value OR an event resource. This is meant to both facilitate legacy data that may exist only in stringed forms as well as provide a mechanism for a more lightweight approach to data modeling depending on local use cases. Additionally, the model includes an optional `arm:ItemHistory` superclass to gather all events for a resource together if needed. This optional superclass contains the following optional subclasses: `arm:ExhibitionHistory`, `arm:ConservationHistory`, `arm:CustodialHistory`, in order to offer more granularity if an implementing institution wishes for this distinction. While an implementor is not required to group various `arm:Event` instances within `arm:ItemHistory` or its subclasses, the ARM Editorial Group believes that this will allow for easier querying.

Implementers are encouraged to use properties and classes from other namespaces when appropriate in addition or instead of ARM, such as `schema:Event` (for exhibit information) and

premis:Event (for digital objects). Event typing is accomplished through the property arm:hasType in conjunction with recommended vocabularies earlier in this document.

Classes

arm:ItemHistory
arm:Event

Subclasses of arm:ItemHistory

arm:ExhibitionHistory
arm:ConservationHistory
arm:CustodialHistory

Properties

arm:hasRelatedEvent *to link events together*
arm:hasType

Relevant/suggested properties from other namespaces

bf:agent
bf:note
bf:date
bf:place
bf:hasPart
seq:precedes/seq:follows *to link events sequentially*
frapo:isOutputOf/hasOutput *for events that generate a new resource*

Example:

An exhibit:

```
:event1 a arm:Event, arm:Exhibition, schema:Event ;  
  bf:title a title3 ;  
  bf:date "2014-04-04" ;  
  bf:place <http://id.loc.gov/authorities/names/n79007751> ;  
  bf:contribution :contribution2 .
```

Conservation History:

```
<event2> a arm:Event, arm:ConservationHistory ;  
  bf:agent <http://id.loc.gov/authorities/names/n79021281> ;  
  bf:date "2014-04-30"^^edtf:EDTF ;  
  frapo:hasOutput <assessment1> .
```

```
<assessment1> a arm:ConditionAssessment ;  
  frapo:isOutputOf <event2> ;  
  arm:describes <physicalCondition1> .
```

```
<physicalCondition1> a arm:PhysicalCondition ;
```

```
rdfs:label "Excellent" ;  
arm:describedBy <assessment1> ;  
arm:isPhysicalConditionOf <item1> .
```

Font, Handwriting, Notations

In rare material cataloging the capture of information about writing systems, font, and handwriting types is critical for describing important traits of resources in library and archive collections. BIBFRAME provides a foundation for rare material descriptive needs in these areas; the following extensions to BIBFRAME are meant to allow for better provisions for rare material cataloging.

ARM v1.0 includes a *Font* class to describe all font properties of a resource (or part of a resource), including typeface (e.g., Courier, Arial), size, and style (e.g., bold, italics). It also includes a class *Typeface* with named individuals from a typeface vocabulary, and a class *FontStyle* with named individuals from a controlled font style vocabulary. The Measurement model can be used to describe size.

ARM v1.0 proposes predicate *:writtenIn* to relate a bibliographic resource (most likely *Instance* or *Item*) to a *Font*, and predicates *hasTypeface*, *hasStyle* to relate a *Font* instance to its *Typeface* and *FontStyle*. Predicates from the Measurement model would be used to model font size.

ARM v1.0 proposes reusing the *writtenIn* predicate to relate a bibliographic resource (most likely *Instance* or *Item*) to a particular example of *Handwriting*. It also recommends the predicate *hasHandwritingType* to relate a *Handwriting* instance to its *HandwritingType*, and *dcterms:description* to further describe the particular *Handwriting* and use of a *HandwritingType*. Note that *writtenIn* is reused from the *Font* pattern above. Predicates from the Measurement model could also be used to model handwriting size if deemed important to capture.

Classes

- arm:Font
- arm:FontStyle
- arm:Typeface
- arm:Handwriting
- arm:HandwritingType

Properties

- arm:writtenIn
- arm:hasTypeface
- arm:hasStyle
- arm:hasHandwritingType

arm:hasNotation

Examples:

Font

```
:it a :bf:Item ;  
    :writtenIn :fnt .  
  
:fnt a arm:Font ;  
    :hasTypeface :courier ;  
    :hasStyle :bold , :italics ,  
    :hasMeasurement :meas .  
  
:meas a arm:Measurement ;  
    rdfs:label "11 point" ;  
    arm:hasUnit :point ;  
    rdf:value "11" .  
  
:courier a owl:NamedIndividual, arm:Typeface .  
:bold a owl:NamedIndividual, arm:Style .  
:italics a owl:NamedIndividual, arm:Style .
```

Handwriting Type

```
:it a :bf:Item ;  
    arm:hasNotation :latin ;  
    arm:writtenIn :HandWriting1 .  
  
:HandWriting1 :hasHandwritingType :frenchGothicBookhand ;  
    dcterms:description "French Gothic bookhand in university style  
(littera parisiensis)" .  
  
:latin a owl:NamedIndividual, bf:Script .  
:frenchGothicBookhand a owl:NamedIndividual, arm:HandwritingType .  
:cursive a owl:NamedIndividual, :Style .
```

Limitation Statement

Limitation statements describe the limited production size and nature of a print run. Limitation statements can be applied to any limited manufacture run of books, recordings, magazines, etc, as well as for documents traditionally produced at a smaller scale (e.g. prints, artists' books, fine prints, etc.). Limitation statements are often found in modern materials, but can be present in materials as early as the 15th century.

Limitation statements generally give the total number of copies printed, and often describe how copies within the run are enumerated (for example, numerically (e.g., 1-250) or alphabetically (e.g. A-N)), as well as the types of proofs present in the print run (e.g., artist's proofs, studio copies, not for trade proofs, etc.). Limitation statements can also give further details about more granular ways the print run has been numbered (e.g., 250 copies, 50 of which have been signed by the author).

Limitation statements usually have two components: the limitation statement relating to the entire instance, and the enumeration of the individual item. Either piece can exist without the other, but when present, both should be represented bibliographically in order to provide the greatest amount of information about the resource.

Limitation statements are important to researchers because they are a clear indication about the scarcity of an instance, and can give details about the production and distribution of a resource. The copy's numbering, for its part, can provide specific details about a given item, such as whether it was one of the numbered copies that was issued with an additional print, or whether it was a copy that was distributed among the author's friends rather than sold.

Example:

Instance

```
<note1> a bf:Note
  arm:hasType "Limitation Statement" ;
  rdfs:label "Limited to fifty-two sets. There are forty sets
numbered 1-40, ten artist's sets lettered A-J and two publisher's
sets. Each set includes ten artist-made and signed hand-pulled
photogravures and a book with fifteen poems by Keagan LeJeune" .
```

Item

```
<item1> a bf:Item ;
  bf:note <note2> ;
  bf:itemOf <instance1> .
<note2> a bf:Note
  arm:hasType "Limitation Statement" ;
  rdfs:label "Copy number 3" .
```

Markings

Markings are defined as symbols, notations, or other marks present in or applied to an object during or after creation. By intent, BIBFRAME does not provide deep modeling of resource components or physical description; these areas are left to domain extensions.

The Marking model is quite simple, involving a class hierarchy descending from a Marking superclass, and a pair of predicates to relate the Marking to the object marked. Other modeling derives from other models such as the BIBFRAME Contributions and Materials models, as well as standard terms used in the Art and Rare Materials application profiles for dates, descriptions, and other properties.

Classes:

arm:Marking
arm:Annotation
arm:Autograph
arm:BindersTicket
arm:Bookplate
arm:Inscription
arm:Label
arm:Marginalia
arm:Seal
arm:Stamp
arm:Watermark

Properties:

arm:marks
arm:markedBy

Example:

```
:binding a arm:Binding ;  
    arm:markedBy :marking ;  
    bf:contribution :contribution1 .  
  
:marking a arm:Autograph ;  
    rdf:value "M.A." ;  
bf:contribution :contribution2 .  
  
:contribution1 a bf:Contribution ;  
    bf:role <http://id.loc.gov/vocabulary/relators/dsr>  
    bf:agent :margaret_armstrong .  
  
:contribution2 a bf:Contribution ;  
    bf:role <http://id.loc.gov/vocabulary/relators/cre>  
    bf:agent :margaret_armstrong .
```

Measurements

In current MARC cataloging practice dimensions are recorded in one single subfield (300 \ \$c) even if the content standard or domain specific cataloging practice directs the cataloger to record the measurements in much more detail. BIBFRAME has carried this forward by defining the datatype property bf:dimensions. ARM has defined a particular class to address this gap.

The ARM measurement model was developed specifically to address the descriptive needs of bibliographic items in the art and rare materials domains, but it could be useful in the description of a broad range of resources.

Classes

arm:MeasurementGroup
arm:Measurement

Properties

arm:hasMeasurementGroup
arm:isMeasurementGroupOf
arm:hasMeasurement
arm:isMeasurementOf
arm:measures
arm:measuredBy

Relevant/suggested properties from other namespaces:

bf:hasUnit
bf:isUnitOf

Example:

```
:instance1 a bf:Instance ;  
    bf:title :title2 ;  
    arm:hasMeasurementGroup :measurementGroup1,  
    :measurementGroup2 .  
:measurementGroup1 a arm:MeasurementGroup ;  
    arm:isMeasurementGroupOf :instance1 ;  
    arm:hasMeasurement :measurement1, :measurement2 .  
  
:measurementGroup2 a arm:MeasurementGroup ;  
    arm:isMeasurementGroupOf :instance1 ;  
    arm:hasMeasurement :measurement3, :measurement 4 .  
  
:measurement1 a arm:Measurement ;  
    arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;  
    rdf:value "117" ;  
    arm:measures <http://vocab.getty.edu/aat/300055644> ;  
    arm:isMeasurementOf :measurementGroup1 .
```

```

:measurement2 a arm:Measurement ;
    arm:hasUnit <http://qudt.org/vocab/unit#Centimeter>
    rdf:value "80.6" ;
    arm:measures <http://vocab.getty.edu/aat/300055647> ;
    arm:isMeasurementOf :measurementGroup1 .

:measurement3 a arm:Measurement ;
    arm:hasUnit <http://qudt.org/vocab/unit#Inch> ;
    rdf:value "46" ;
    arm:measures <http://vocab.getty.edu/aat/300055644> ;
    arm:isMeasurementOf :measurementGroup2 .

:measurement4 a arm:Measurement ;
    arm:hasUnit <http://qudt.org/vocab/unit#Inch> ;
    rdf:value "34" ;
    arm:measures <http://vocab.getty.edu/aat/300055644> ;
    arm:isMeasurementOf :measurementGroup2 .

```

Notes

ARM uses the `bf:Note` Class for notes about a resource, alongside `arm:hasType` to provide context about the type of note defined.

Pagination and Foliation

In descriptive cataloging of rare materials, recording a precise, detailed physical description of pagination and/or foliation is considered important, since providing this type of description supplements the information recorded in extent and often elaborates on anomalies or errors. A detailed pagination and/or foliation information can also help to distinguish one edition from another.

The modelling for pagination and foliation remains unchanged in v 1.0. ARM uses `arm:PaginationFoliation` in order to record detailed descriptions of the extent of a resource. As a subclass of `bf:Extent`, `arm:PaginationFoliation` enables detailed physical description of pagination and/or foliation. This subclass should be used in order to record this more detailed description in a more structured manner more suited to rare materials description standards. Any errors or irregularities in the pagination/foliation may be recorded by using `dcterms:description`.

Suggested/Related Class

`arm:PaginationFoliation`

Related Superclass from another namespace

bf:Extent

Related Class from another namespace

bf:Unit

Suggested properties from other namespaces

bf:extent

bf:count

bf:unit

dcterms:description

Examples

Example 1

```
:item1 a bf:Item ; bf:extent :extent1 .
```

```
:item1 bf:extent :extent1 .
```

```
:extent1 a arm:PaginationFoliation ;  
  rdf:value "[13], CCCI leaves (leaves [1], [12-13] blank)" ;  
  dcterms:description "Errors in foliation: leaves v, x, Cxliiiij,  
  Cxlxi, CCxlxi, CClxxvij misnumbered vij, v, Cxlv, Clxxi,  
  CClxix, CClxxvi respectively." .
```

Example 2

```
:item2 a bf:Item ; bf:extent :extent2 , :extent3 .
```

```
:extent2 a bf:Extent ;  
  rdf:value "2 volumes" .
```

```
:extent3 a arm:PaginationFoliation ;  
  rdf:value "[20], 907, [29]; [8], 196, [16], 89, [3] pages, 64  
  leaves, [2], 67-116, [4] pages, 273 columns, [3] pages, [2]  
  folded leaves of plates" ;  
  dcterms:description "Error in foliation, tome 2: Leaf 2  
  numbered 3; Errors in pagination, tome 2: Pages 73-74, 79-80,  
  8th sequence, numbered 72-73, 78-79 respectively." .
```

Example 3

```
:item3 a bf:Item ; bf:extent :extent4 , :extent5 .
```

```
:extent4 a bf:Extent ;  
  rdf:value "2 v. in 1" .
```

```
:extent5 a :PaginationFoliation ;
```

```

rdf:value "[2], 217, [1], 110, [12] leaves" ;
    dcterms:description "Errors in foliation: first grouping: 12
unnumbered; 61 as 51; 86 as 80; 154 repeated; 157 as 156; 196
as 194; 210 as 201; no leaf numbered 215. Second grouping: 13
as 7; 31 unnumbered; 73 as 74; 95 as 98." .

```

Signature Statement

Signatures are an integral component of rare books cataloguing. As with version 0.1, the ARM Ontology has defined a Class and Property for recording signatures, and recommends reusing dcterms:description for additional information about the signature, including but not limited to the complexities and irregularities that may occur.

Class

arm:SignatureStatement

Property

arm:hasSignatureStatement

Suggested/Recommended Properties from other namespaces

dcterms:description

Examples

Example 1

```

:instance1 arm:hasSignatureStatement :signatureStatement1 .

:signatureStatement1 a arm:SignatureStatement ;
    rdf:value "1-1212 and A-S8" ;
    dcterms:description "Actual gatherings cannot be determined" .

```

Example 2

```

:instance4 arm:hasSignatureStatement :signatureStatement1 ;
    rdf:value "[star]4 A-G8 H4 2A-2E8" ;
    dcterms:description "G3 mis-signed as F3" .

```

Style/Period

Style information is based on scholarship in fields such as art history, cultural studies and archeology. As such, it represents a key concept by which specialists categorize cultural objects. Content and data structure standards in museology—including VRA Core, CCO, CDWA, CIDOC CRM, and LIDO—have provisions allowing catalogers to qualify an object by its artistic style. However, no field was ever defined in the MARC format to accommodate style, nor

is there a specific class or property in BIBFRAME, which has largely been designed to move our existing library data into linked data.

Stylistic information is closely related to the cultural context of the work, since a style or period may be characteristic of a given culture (e.g. Minoan Style, Spanish Colonial Style, Olmec Style). Art cataloging standards have dealt with culture and nationality in various ways. In general, culture and nationality are considered attributes of the agent and should be recorded as such. In the case of nationality this is uncontroversial, since by definition only persons can have nationality. However, culture can at times be considered an attribute of a work, for example, cultural objects created by a group of people, or a work deliberately created by an artist in the style of a culture that is not his/her own. The attribution of culture in these cases is more closely aligned with style; to the extent that culture adheres to a work, it can be captured by the concept of Style/Period. This group therefore recommends the usage of `arm:hasStylePeriod` for recording cultural-related information in the work context, and reserves direct attribution of nationality and culture to agents.

There is no modeling of Style/Period in BIBFRAME.

The ARM Style/Period model is quite simple, involving two predicates, `arm:hasStylePeriod` and `arm:isStylePeriodOf`, and a class `arm:StylePeriod`. The range of `hasStylePeriod` and domain of `isStylePeriodOf` are left unspecified so that vocabularies (such as AAT) can be used without unwanted type entailments.

Relevant Properties and Class:

- `arm:hasStylePeriod`
- `arm:isStylePeriodOf`
- `arm:StylePeriod`

```
:work a bf:StillImage ;
    bf:title :title ;
    arm:hasStylePeriod :style_period .

:style_period a arm:StylePeriod ;
    arm:hasType <http://vocab.getty.edu/aat/300172863> .

:title rdf:value "Atala et Chactas" .
```

Titles

Origins

Title origins (the place from which a title originates, i.e. container, margin, spine) are less clearly defined for objects different from regular print books. As such, ARM created the property `arm:hasOrigin` alongside a [vocabulary](#) to denote from where the title derives. Beyond what can be controlled, DCRM(G) 1B2 states: Always make a note on the source of the title proper. The

examples given are: Title from lower margin; Title from ink note on book of mount; title from item, etc. This list could potentially be endless. For the sake of consistency, this type of information may be recorded as a note.

Sources

Titles for art and cultural objects are often derived from external sources, such as reference works. These external sources may be recorded using `arm:hasSource`.

Preferred title

When a resource has several titles, it is important to identify the one that is preferred for identification and display. Examples of this are title changes, titles in multiple languages, and objects that may have become known under more than one title over time. The preferred title may be indicated using `arm:hasPreferredTitle`.

Domain-specific Guidelines and Examples

Archives

The ARM/BIBFRAME ontologies are not meant to replace archives domain-specific ontologies such as [RiC-O](#). Rather, the recommendations below for archives map archival data and other cultural heritage data into BIBFRAME classes and properties for interoperability. As with MARC, BIBFRAME/ARM enables archives to represent high-level metadata about archival collections in a shared bibliographic framework.

Suggested DACS to ARM/BF mappings

DACS element	Obligation	ARM/BF mapping
2.1 Reference code	R	
2.2 Name and Location of Repository	R	
2.3 Title	R	bf>Title
2.4 Date	R	bf>Date (et al)
2.5 Extent	R	bf:Extent
2.6 Name of creator(s)	R	bf:Agent
2.7 Administrative/Biographical History	O	bf>Note arm:hasType (see arm Note vocabulary)
3.1 Scope and content	R	bf:Summary
3.2 System of arrangement	O	arm:hasArrangement, bf:arrangement
4.1 Conditions governing access	R	bf:AccessPolicy
4.2 Physical access	O	bf:AccessPolicy
4.3 Technical access	O	bf:AccessPolicy
4.4 Conditions governing reproduction and use	O	bf:UsePolicy
4.5 Languages and scripts of the material	R	bf:Language
4.6 Finding aids	O	bf:findingAid

5.1 Custodial history	O	bf:custodialHistory <i>or</i> arm:ItemHistory
5.2 Immediate source of acquisition	O	bf:ImmediateAcquisition <i>or</i> arm:ItemHistory
5.3 Appraisal, destruction, and scheduling information	O	arm:ItemHistory
5.4 Accruals	O	arm:ItemHistory
6.1 Existence and location of originals	O	bf:isReproductionOf
6.2 Existence and location of copies	O	bf:hasReproduction
6.4 Publication note	O	bf:Note arm:hasType (see arm Note vocabulary)
7.0 Note	O	bf:Note arm:hasType (see arm Note vocabulary)

Dates

Dates can be expressed as start and end dates with a single value or as a bf:originDate, which should contain only the date associated with the creation of the work.

```
arm:startDate "1967-09-27"^^xsd:date ;
arm:endDate "2000-02-16"^^xsd:date ;
or
bf:originDate "1967-09-27"^^xsd:date
or
bf:date "1967/2000"^^<http://id.loc.gov/datatypes/edtf>
```

Note: The authors of the implementation guidelines for the archives-specific guidelines recognize that this provides multiple options for expressing the same information. We hope to reconcile this in the future based on input from the adopters of the ARM Ontology Extension.

Extent statements

The extent of an archival collection should be expressed as bf:Extent. If desired, extent can be expressed both as a bf:Extent and as an arm:Measurement if there is a need to more closely track different measurements of materials in a collection. bf:relatedTo can be used to link extent and measurements together.

Extent statement only:

```
<extent1> a bf:Extent ;
  rdfs:label "3145.0 linear feet (1189 cartons, 2691 boxes, 35
flat-boxes, 12 half-boxes, 55 oversized flat-boxes, 11
```

```
card-boxes, 9 photo-boxes, 2 cassette-boxes, 36 large
map-folders, 10 small map-folders)" .
```

Extent and measurement statements:

```
<measurementGroup1> a arm:MeasurementGroup ;
    arm:hasMeasurement <measurement1>, <measurement2> .

<measurement1> a arm:Measurement ;
    arm:hasUnit <http://vocab.getty.edu/aat/300404397> ;
    rdf:value "3145" ;
    dcterms:description "1189 cartons, 2691 boxes, 35 flat-boxes,
12 half-boxes, 55 oversized flat-boxes, 11 card-boxes, 9
photo-boxes, 2 cassette-boxes, 36 large map-folders, 10 small
map-folders" .

<measurement2> a arm:Measurement ;
    rdfs:label "1189 cartons, 2691 boxes, 35 flat-boxes, 12
half-boxes, 55 oversized flat-boxes, 11 card-boxes, 9
photo-boxes, 2 cassette-boxes, 36 large map-folders, 10 small
map-folders" .

<extent1> a bf:Extent ;
    rdfs:label "3145.0 linear feet (1189 cartons, 2691 boxes, 35
flat-boxes, 12 half-boxes, 55 oversized flat-boxes, 11
card-boxes, 9 photo-boxes, 2 cassette-boxes, 36 large
map-folders, 10 small map-folders)" ;
    bf:relatedTo <measurement1> .
```

Notes and custodial histories

Archival description tends to rely on notes describing custodial history, conservation history, and other actions. ARM provides a vocabulary for many of these notes and enables implementers to type notes if desired. Depending on local implementation decisions, these notes can be encoded as textual notes attached to the collection resource and/or expressed using `arm:ItemHistory`.

Notes expressed as stringed textual notes:

```
<note3> a bf:Note ;
    arm:hasType "ProcessingNote" ;
    rdfs:label "This collection received a basic level of
processing, including rehousing and in some instances minimal
organization. Various acquisitions associated with the
collection have not been merged and organized as a whole. Each
acquisition is described separately in the contents list below,
identified by a unique call number and titled according to
month and year of acquisition."
```

Custodial history expressed as a series of Events (arm:ItemHistory)

This custodial history describes the events associated with acquisition of a collection.

```
<note4> a bf:Note ;
    arm:hasType <bf:ImmediateAcquisition> ;
    rdfs:label "This collection was given by the Mexican
American Legal Defense and Educational Fund to Stanford
University, Special Collections in 1984, 1995, 1996, 1999,
2000, and 2002."

<itemHistory1> a bf:ItemHistory ;
    bf:hasPart <event1>, <event2>, <event3>, <event4>, <event5>,
<event6> .

<event1> a arm:Event ;
    bf:contribution <contribution2> ;
    bf:date "1984" ;
    arm:hasType <http://vocab.getty.edu/aat/300417637> .

<event2> a arm:Event ;
    bf:contribution <contribution2> ;
    bf:date "1995" ;
    arm:hasType <http://vocab.getty.edu/aat/300417637> .

<event3> a arm:Event ;
    bf:contribution <contribution2> ;
    bf:date "1996" ;
    arm:hasType <http://vocab.getty.edu/aat/300417637> .

<event4> a arm:Event ;
    bf:contribution <contribution2> ;
    bf:date "1999" ;
    arm:hasType <http://vocab.getty.edu/aat/300417637> .

<event5> a arm:Event ;
    bf:contribution <contribution2> ;
    bf:date "2000" ;
    arm:hasType <http://vocab.getty.edu/aat/300417637> .

<event6> a arm:Event ;
    bf:contribution <contribution2> ;
    bf:date "2002" ;
    arm:hasType <http://vocab.getty.edu/aat/300417637> .

<contribution2> a arm:Contribution ;
```

bf:agent <<http://id.loc.gov/authorities/names/n80044402>> ;
bf:role <<http://id.loc.gov/vocabulary/relators/dnr>> .

Art

The ARM/BIBFRAME ontologies are not meant to replace art domain-specific ontologies such as the [CIDOC-CRM](#). The art specific components of the ARM ontology are meant to enable art libraries that are used to describing art and cultural objects within the context of their bibliographic collections to continue to follow this model in a post-MARC environment. Specifically, the following recommendations are meant to map art and other cultural heritage data into the context of BIBFRAME classes and properties for interoperability. As with MARC, BIBFRAME/ARM enables libraries to represent metadata about such collections in a shared bibliographic framework.

A large number of [art library colleagues](#) were involved in the development of the ARM 0.1 version. During the initial work, we discovered that any number of content standards were used to describe art and cultural objects, many very much reliant on various textual notes. So rather than "translating" MARC practices into the linked data world, the development of the ARM ontology was based on use cases envisioning how art and cultural objects should be described in this context.

Much of this work has been retained in the ARM 1.0 version of the ontology while a few modeling areas have been revisited to enhance interoperability further.

The following (completely made up) example illustrates modeling areas critical for describing art objects:

Work description:

```
<work1> a bf:Work, bf:StillImage ;
    arm:hasPreferredTitle <title1> ;
    bf:title <title2> ;
    bf:contribution <contribution1>, <contribution2> ;
    bf:genreForm <genreForm1> ;
    arm:hasStylePeriod <http://vocab.getty.edu/aat/300111215>,
<http://vocab.getty.edu/aat/300386045> ;
    bf:summary <summary1> ;
    bf:hasInstance <instance1> .
```

```
<contribution1> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/n78086005> ;
    bf:role <http://id.loc.gov/vocabulary/relators/art> .
```

```
<contribution2> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/n79038450> ;
    bf:role <http://id.loc.gov/vocabulary/relators/art> .
```

```
<title1> a bf>Title ;
```

```

    rdfs:label "The Disasters of War"@en ;
    bflc:titleSortKey "Disasters of War"@en ;
    bf:mainTitle "The Disasters of War"@en ;
    arm:origin arm:supplied ;
    arm:hasSource <http://example_art_dictionary> ;
    arm:isPreferredTitleOf <work1> .

<title2> a bf:Title ;
    rdfs:label "Los desastres de la guerra"@es ;
    bflc:titleSortKey "Desastres de la guerra"@es ;
    bf:mainTitle "Los desastres de la guerra"@es ;
    arm:titleOf <work2> .

<genreForm1> a bf:genreForm ;
    arm:hasType <http://vocab.getty.edu/aat/300033618> .

<summary1> a bf:Summary ;
    rdfs:label "This painting represents scenes of horror from the
    aftermath of war and relates to the early days of the Spanish Civil
    War" .

Instance description:

<instance1> a bf:Instance ;
    bf:title <title3> ;
    arm:hasMeasurementGroup <measurementGroup1>, <measurementGroup2>,
    <measurementGroup3>, <measurementGroup4> ;
    bf:material1 :material1 ;
    bf:provisionActivity <provisionActivity1> ;
    bf:extent <extent1> ;
    bf:copyrightRegistration <copyrightRegistration1> ;
    bf:instanceOf <work1> ;
    bf:hasItem <item1> .

<contribution3> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/no2009019571> ;
    bf:role <http://id.loc.gov/vocabulary/relators/cph> .

<copyrightRegistration1> a bf:CopyrightRegistration ;
    bf:contribution <contribution3> .

<extent1> a bf:Extent ;
    rdfs:label "1 Painting" .

:material1 a bf:Material ;

```



```

    rdfs:label "Oil on canvas" .

<provisionActivity1> a bf:ProvisionActivity ;
    bf:place <http://vocab.getty.edu/tgn/7008038> ;
    bf:date "1937" .

<title3> a bf>Title ;
    rdfs:label "The Disasters of War"@en ;
    bf:mainTitle "Disasters of War"@en ;
    arm:titleOf <instance1> .

```

Measurement group illustrating the object measured both with and without frame in both inches and centimeters:

```

<measurementGroup1> a arm:MeasurementGroup ;
    arm:isMeasurementGroupOf <instance1> ;
    arm:hasMeasurement <measurement1>, <measurement2> .

<measurementGroup2> a arm:MeasurementGroup ;
    arm:isMeasurementGroupOf <instance1> ;
    arm:hasMeasurement <measurement3>, <measurement4> .

<measurementGroup3> a arm:MeasurementGroup ;
    arm:isMeasurementGroupOf <instance1> ;
    dcterms:description "with frame" ;
    arm:hasMeasurement <measurement5>, <measurement6> .

<measurementGroup4> a arm:MeasurementGroup ;
    arm:isMeasurementGroupOf <instance1> ;
    dcterms:description "with frame" ;
    arm:hasMeasurement <measurement7>, <measurement8> .

<measurement1> a arm:Measurement ;
    arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
    rdf:value "91.4 " ;
    bf:measures <http://vocab.getty.edu/aat/300055644> ;
    arm:isMeasurementOf <measurementGroup1> .

<measurement2> a arm:Measurement ;
    arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
    rdf:value "106.7" ;
    bf:measures <http://vocab.getty.edu/aat/300055647> ;
    arm:isMeasurementOf <measurementGroup1> .

```

```

<measurement3> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Inch> ;
  rdf:value "36" ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup2> .

<measurement4> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Inch> ;
  rdf:value "42" ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup2> .

<measurement5> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
  rdf:value "106.7 " ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup3> .

<measurement6> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
  rdf:value "121.9" ;
  bf:measures <http://vocab.getty.edu/aat/300055647> ;
  arm:isMeasurementOf <measurementGroup3> .

<measurement7> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Inch> ;
  rdf:value "42" ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup4> .

<measurement8> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Inch> ;
  rdf:value "48" ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup4> .

```

Item description:

```

<item1> a bf:Item ;
  bf:identifiedBy <accessionNumber1> ;
  arm:markedBy <inscription1> ;
  arm:hasItemHistory <itemHistory1> ;
  arm:hasPhysicalCondition <physicalCondition1> ;
  bf:itemOf <instance1> .

```

```

<accessionNumber1> a bf:AccessionNumber ;
  rdf:value "TESTRECORD1_University_ArtMuseum" ;
  bf:assigner <http://id.loc.gov/vocabulary/organizations/xxxxxx> .

<inscription1> a arm:Inscription ;
  rdfs:label "Signed lower left by both artists" ;
  arm:marks <item1> .

```

Item history containing exhibition, custodial and conservation histories. Item history events are subclassed into these three areas so that each can be queried separately.

```

<itemHistory1> a arm:ItemHistory ;
  bf:hasPart <event1>, <event2>, <event3> .

<event1> a arm:Event, arm:Exhibition ;
  bf:title <title4> ;
  bf:date "1977/1978"^^edtf:EDTF ;
  bf:place <http://vocab.getty.edu/tgn/7008038> ;
  bf:contribution <contribution4> .

<contribution4> a bf:Contribution ;
  bf:agent <http://id.loc.gov/authorities/names/n80039965> ;
  bf:role <http://id.loc.gov/vocabulary/relators/his> .

<title4> a bf>Title ;
  rdfs:label "Barcelona and Modernity"@en ;
  bf:mainTitle "Barcelona and Modernity"@en ;
  arm:titleOf <event1> .

<event2> a arm:Event, arm:ConservationHistory ;
  bf:agent <http://id.loc.gov/authorities/names/n79021281> ;
  bf:date "2014-04-30"^^edtf:EDTF ;
  frapo:hasOutput <assessment1> .

<assessment1> a arm:ConditionAssessment ;
  frapo:isOutputOf <event2> ;
  arm:describes <physicalCondition1> .

<physicalCondition1> a arm:PhysicalCondition ;
  rdfs:label "Excellent" ;
  arm:describedBy <assessment1> ;
  arm:isPhysicalConditionOf <item1> .

<event3> a arm:event ; arm:CustodialHistory ;
  arm:hasRelatedEvent <event4>, <event5>, <event6>, <event7> ;

```

```

    bf:contribution <contribution5>, <contribution6>, <contribution7> .

<http:event4> a arm:Event ;
    arm:hasType <http://vocab.getty.edu/aat/300438483> ;
    bf:contribution <contribution5>, <contribution6> ;
    seq:precedes <event5> ;
    arm:hasRelatedEvent <event3>, <event5> .

<contribution5> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/no2017100652> ;
    bf:role <http://id.loc.gov/vocabulary/relators/sll> .

<contribution6> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/n50049079> ;
    bf:role <buyer> .

<event5> a arm:Event ;
    arm:hasType <http://vocab.getty.edu/aat/300417638> ;
    seq:follows <event4> ;
    bf:date "1955"^^edtf:EDTF ;
    bf:contribution <contribution7>, <contribution8> ;
    arm:hasRelatedEvent <event3>, <event4> .

    <contribution7> a bf:Contribution ;
        bf:agent <http://id.loc.gov/authorities/names/n50049079> ;
        bf:role <http://id.loc.gov/vocabulary/relators/dnr> .

<contribution8> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/n81024714> ;
    bf:role <gift_recipient> .

```

Rare Books

The ARM/BIBFRAME ontologies are intended to be used in conjunction with rare materials-specific content standards and vocabularies, such as the Descriptive Cataloging of Rare Materials (DCRM) suite of manuals, and the Rare Books and Manuscripts Section (RBMS) vocabularies. The recommendations below map descriptive and other data related to select formats of rare materials into BIBFRAME classes and properties for interoperability. As with MARC, BIBFRAME/ARM enables rare materials catalogers to represent detailed descriptions of resources, their physical characteristics, and their provenance, in a shared bibliographic framework. Examples from Archives and Art may also be relevant to Rare Materials.

Item description:

```
<https://mcgill.on.worldcat.org/oclc/11277298> a bf:Item ;
    arm:markedBy :marking1, :marking2, :marking3 ;
    arm:hasItemHistory :ItemHistory1 .

:ItemHistory1 ;
    bf:hasPart :ItemEvent1 .

:marking1 a arm:Inscription ;
    rdfs:label "signature of R. Kindle on title page and verso of
final page of index.";
    arm:marks :item1 .

:marking2 a arm:Marking ;
    rdfs:label "With note on the contents and relevance of this
work in hand on verso of title page, signed and dated by Joseph
Gibbs, Banff, Sept. 15, 1826." ;
    arm:marks :item1 .
```

Description of a binding event:

```
:ItemEvent1 a arm:Event arm:hasType
<http://vocab.getty.edu/page/aat/300053592>
    bf:hasPart :binding1

:binding1 a arm:Binding arm:hasType
<http://vocab.getty.edu/page/aat/300211457> ;

    rdfs:label: "Rebound half-bound Oasis leather and Cockerell
paper; title on spine in gilt; binder's note (H.P. Cantlie) on
restorations and rebinding signed and dated laid loose;
binder's ticket for H.P. Cantlie on rear pastedown." ;
    bf:contribution :contribution1 ;
```

```

    bf:date: "1963-01-10"^^edtf:edtf ;
    bf:place: <https://id.loc.gov/authorities/names/n80132975> .

:contribution1 a bf:Contribution ;
    bf:agent: "Cantlie, Hortense Pauline Douglas, 1901-1979." ;
    bf:role: <http://vocab.getty.edu/page/aat/300025704> .

:marking3 a arm:BindersTicket ;
    rdfs:label "H.P. Cantlie." ;
    arm:marks :item1 .

```

Example 2

A multi-part artists' book (selected elements only)

Work description

```

<work1> a bf:Work, bf:StillImage, bf:Text ;
    bf:contribution <contribution1> ;
    bf:hasInstance <instance1> .

<contribution1> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/no97068105> ;
    bf:role <http://id.loc.gov/vocabulary/relators/pht>.

```

Instance description

```

<instance1> a bf:Instance ;
    arm:hasMeasurementGroup <measurementGroup1>, <measurementGroup2> ;
    arm:hasNote <note1> ;
    bf:contribution <contribution2> ;
    bf:extent <extent1>, <extent2> ;
    bf:instanceOf <work1> ;
    bf:hasItem <item1> .

<contribution2> a bf:Contribution ;
    bf:agent <http://id.loc.gov/authorities/names/no97068105> ;
    bf:role <http://id.loc.gov/vocabulary/relators/pop>.

<extent1> a bf:Extent ;
    rdfs:label "vii, 27, [2] pages" .

<extent2> a bf:Extent ;
    rdfs:label "10 mounted platinum prints" .

```

```

<measurementGroup1> a arm:MeasurementGroup ;
  arm:isMeasurementGroupOf <instance1> ;
  arm:hasMeasurement <measurement1>, <measurement2> .

<measurementGroup2> a arm:MeasurementGroup ;
  arm:isMeasurementGroupOf <instance1> ;
  arm:hasMeasurement <measurement3>, <measurement4> ;
  dcterms:description "mounted" .

<measurement1> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
  rdf:value "32" ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup1> .

<measurement2> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
  rdf:value "27" ;
  bf:measures <http://vocab.getty.edu/aat/300055647> ;
  arm:isMeasurementOf <measurementGroup1> .

<measurement3> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
  rdf:value "51" ;
  bf:measures <http://vocab.getty.edu/aat/300055644> ;
  arm:isMeasurementOf <measurementGroup2> .

<measurement4> a arm:Measurement ;
  arm:hasUnit <http://qudt.org/vocab/unit#Centimeter> ;
  rdf:value "41" ;
  bf:measures <http://vocab.getty.edu/aat/300055647> ;
  arm:isMeasurementOf <measurementGroup2> .

<note1> a bf:Note
  arm:hasType "Limitation Statement" ;
  rdfs:label "Limited to fifty-two sets. There are forty sets
numbered 1-40, ten artist's sets lettered A-J and two publisher's
sets. Each set includes ten artist-made and signed hand-pulled
photogravures and a book with fifteen poems by Keagan LeJeune" .

```

Item description

```

<item1> a bf:Item ;
  arm:hasNote <note2> ;

```

```
bf:itemOf <instance1> .
```

```
<note2> a bf>Note  
  arm:hasType "Limitation Statement" ;  
  rdfs:label "Copy number 3" .
```