

Useful Abbreviations

VM = Vinland Map. Unknown before 1956.

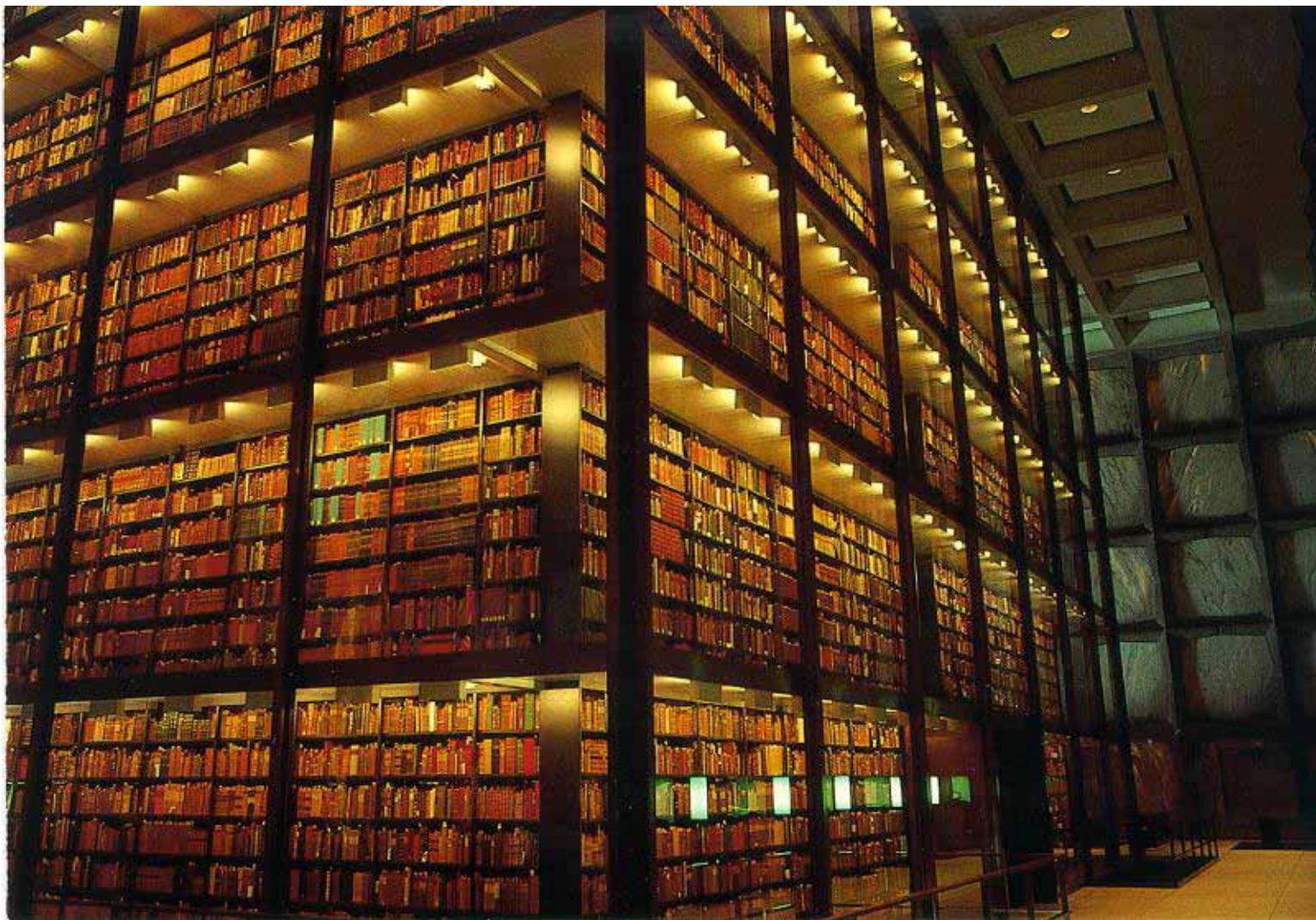
VB = Vincent of Beauvais. A popular, well-known Medieval world history. Widely available in libraries of incunabula.

TR = “Tartar Relation”. A chronicle of a journey of two monks to the farthest reaches of known civilization in Asia, in the 13th C. This account was unknown before 1957.

Beinecke Rare Book and Manuscript Library, Yale University



Rare Book stacks at the Beinecke Library



The Vinland Map, Beinecke Library, photographed in high contrast ca. 1960



Legend 67 from the Vinland Map, taken from “The Vinland Map and the Tartar Relation**” **Yale University Press 1965**. Chapter on “The Vinland Map” by R. A. Skelton, Superintendant of the Map Room, The British Museum. (Original in Latin)**

“By God’s will, after a long voyage from the island of Greenland to the south, toward the most distant remaining parts of the western ocean sea, sailing southward amidst the ice, the companions Bjarni and Leif Ericsson discovered a new land, extremely fertile and even having vines, the which island they named Vinland. Eric [Henricus], legate of the apostolic see and Bishop of Greenland and the neighboring regions, arrived in this truly vast and very rich land, in the name of Almighty God, in the last year of the most blessed Father Pascal, remained a long time in both summer and winter, and later returned northeastward toward Greenland, and then proceeded [i.e. home to Europe?] in most humble obedience to the will of his superiors.”

Comments: Last year of Pope Pascal was 1117 AD. The Icelandic Annals places Bishop Eirik Gnupsson’s visit to Vinland in the year 1121 AD.

History of the Vinland Map (1)

1430 - 1440 AD Scribe copies VB, VM and TR for Council of Basle
They are bound into a book in the order VM (top) VB and TR.

15th to 19th Century: Bookworms bore from VM into VB and from TR into other side of VB.

Late 19th Century: somebody separates VM and TR from VB and rebinds them together in a “Spanish-looking” binding, inexpensively.
VB is rebound in original binding, but binder gets covers on backwards.

1957. Enzo Ferrajoli gets books, offers them on London rare-books market, also to British Museum, who reject the Vinland Map.

History of the Vinland Map (2)

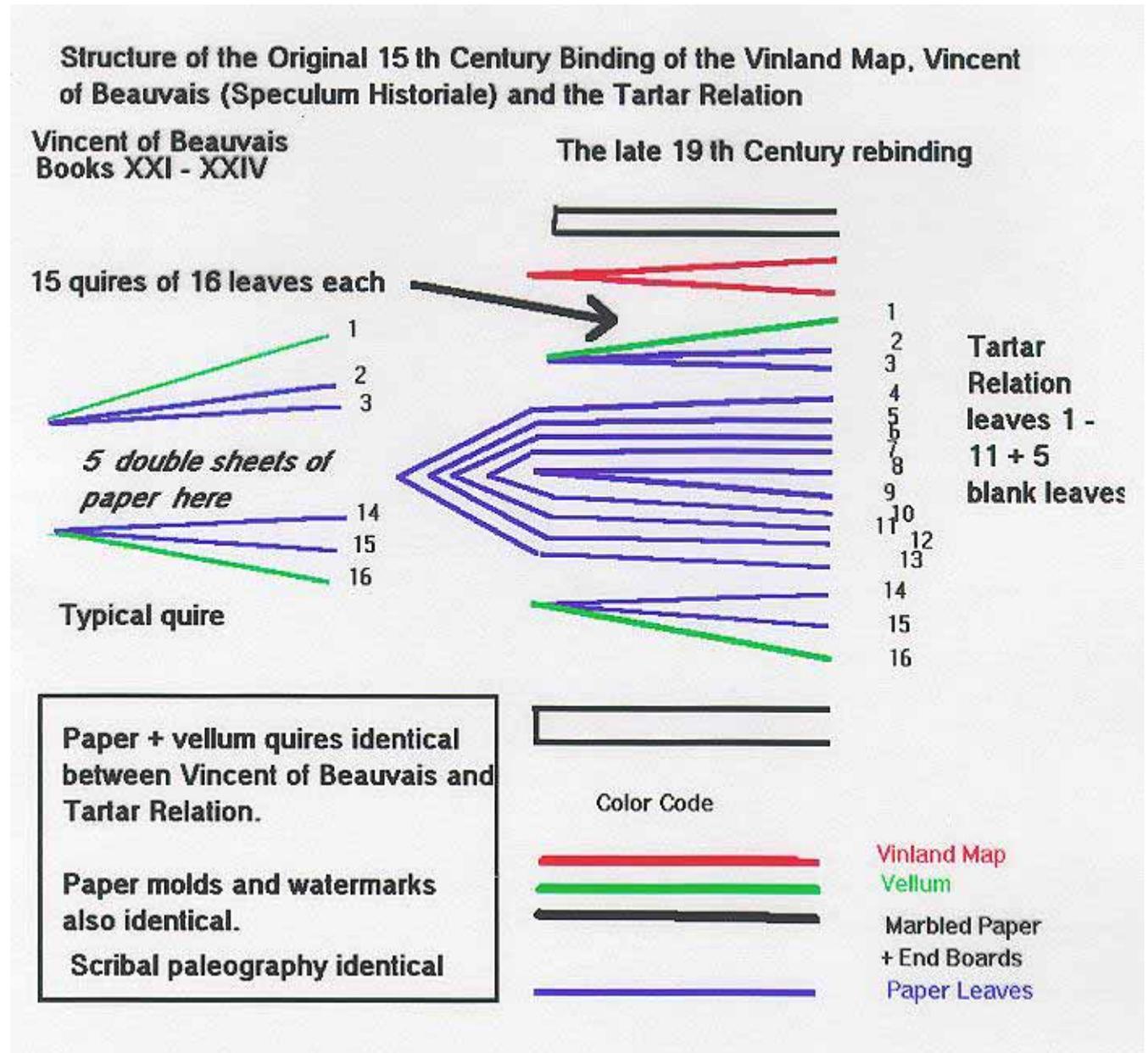
Lawrence Witten III, bookseller to Yale, sees VM + TR in Zurich: buys it for \$3500 in “lawful money”, later called “The greatest bargain in all the world”. Spring of 1957.

Witten shows Vinland Map and Tartar Relation to Marston at Yale. They notice that wormholes in VM and TR do not align. Fall of 1957.

April 1958. Marston (Curator of Classics) buys Vincent of Beauvais from same London book-dealer. They discover that in the arrangement VM, VB, TR, holes now align perfectly.

1959. Marston and Vietor (Curator of Maps at Yale) persuade financier Paul Mellon to purchase map, reported \$1,000,000. Mellon insists on a scholarly study of VM + TR.

How the Vinland Map, the Vincent of Beauvais and the Tartar Relation were originally bound in one volume in the early 1400's.



History of the Vinland Map (3)

1960 Ferrajoli arrested by Spanish police for theft of documents. Serves 3 years. No evidence that VM, TR were stolen.

1965. Yale publishes “Vinland Map and Tartar Relation”; enrages the Italian-American community. VM denounced as a forgery.

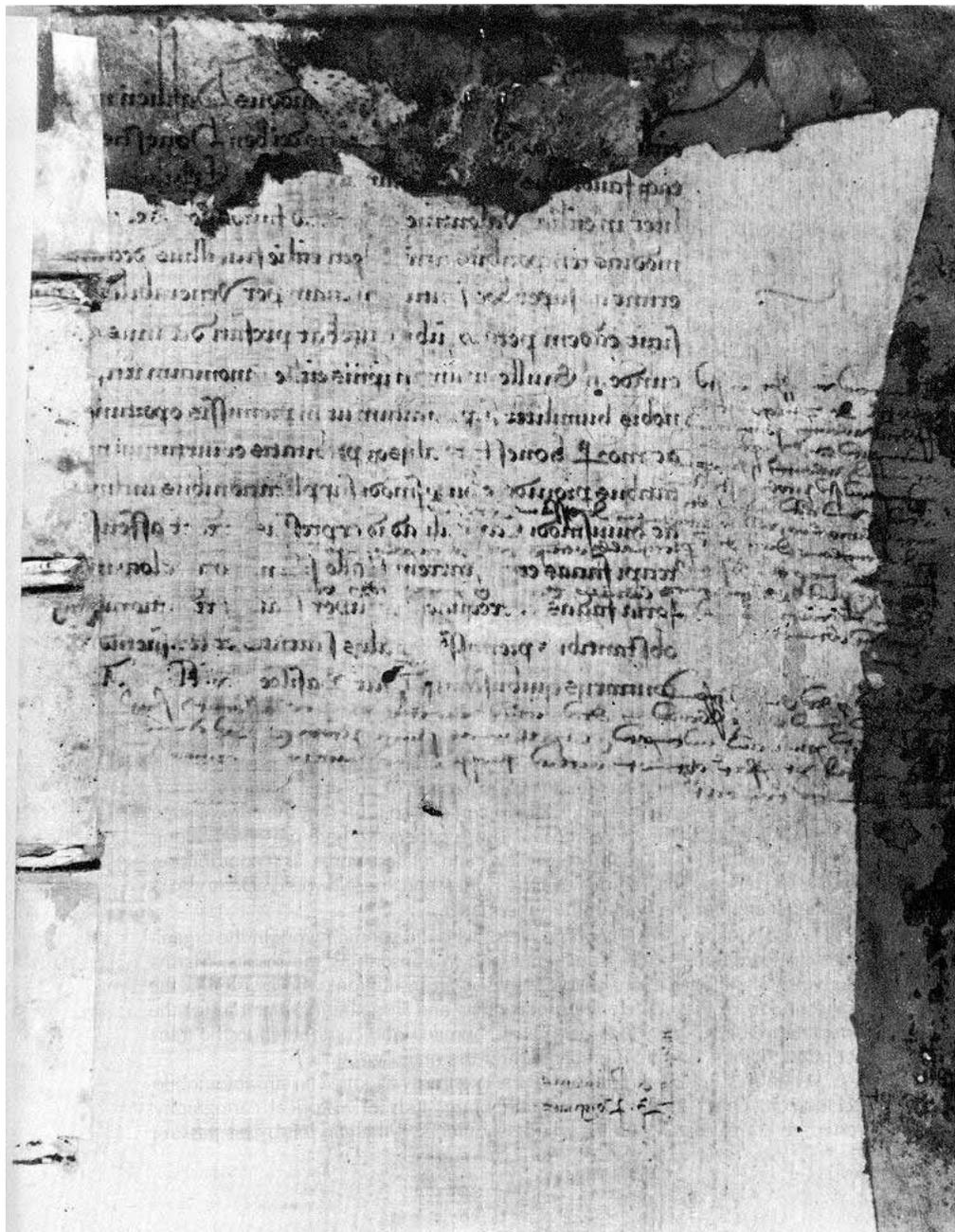
1966. Washburn (Smithsonian) convenes Vinland Map Conference. Pastedown offsets are discovered in original binding, referring to an event at the Council of Basle, 1435. Scholars call for “scientific studies” of the map.

1972. Yale commissions Walter McCrone, microscopist, to study ink of map. He finds “up to 40%” titanium dioxide (anatase) in ink, in form made after 1923. Denounces map as a forgery. Yale announces “Map may be a forgery”.

“Pastedown” found under endpapers in the original 1400’s binding of the “Speculum Historiale” of Vincent of Beauvais.

Print-through (in mirror image) refers to the Council of Basle, (1431-1445 AD).

Discovered at Yale, 1965, but was not known at time of publication of the VM-TR.



**Helge and Anne
Stine Ingstad**



Fig. 1 Anne Stine and Helge Ingstad on board the 'Halten', the boat used for the expeditions.

Literary and Historical Background

Groenlendingasaga in the Flateyjarbok, ca 1380 AD

Bjarni Herjolfsson sails from Iceland to Greenland, loses his way, drifts, sights unknown shores. His crew wishes to land, but he overrules them. Then he sails North, then East, returns to Greenland (986 AD).

Leif Eiriksson sets out on a voyage of discovery from Greenland, to find the land Bjarni had seen. He has a crew of 35. He discovers Helluland, Markland and Vinland, where he builds “large houses”. He remains in Vinland one year, finds grapes, and rescues a ship’s crew on his way back to Greenland. (ca. 1000 AD)

Eirik’s saga in the Hauksbok, 1334 AD

Leif Eiriksson sails from Greenland to Norway, where he is commanded by King Olaf Tryggvason to preach Christianity in Greenland. On his way home, he drifts at sea and finds a new land with grape-vines and wild wheat. The same year he continues his journey to Greenland, saves a ship’s crew, and converts Greenland to Christianity.

Adam of Bremen ca. 1075 AD, Gesta

“He told me too of yet another island, discovered by many in that ocean, which is called Wineland from the circumstances that vines grow there of their own accord and produce the most excellent wine. That there is abundance of unsown corn there we have learned not from fabulous conjecture but from the trustworthy report of the Danes”.

Ari Thorgilsson, ca. 1125 AD, Islendingabok

Mentions Vinland and the Skraelings, quoting his uncle Thorkel Gellison, “whose recollection reached far back” to a man who had gone to Greenland with Eirik the Red.

The Geographical Treatise, ca. 1300 AD

“To the south of Greenland lies Helluland, and then Markland, and from there it is not far to Vinland, which some people consider extends from Africa.”

The "Skalholt" or Sigurd Steffanson map of 1576. Used by Munn in 1909 and the Ingstads in 1960's to locate "Vinland".

Characterem in hac mappa
 concurrentium explicatio
 ipsius Auctoris.

A Hi sunt ad quos Angli per
 venerunt ab auditore nomen
 na. ut. fringam. vel Selen. vel
 mgoris aduisione ferendi ex
 ciccicati

B His proxime est Vinlandia
 quam propter terra facundiam
 tatem et utilium rerum ubere
 rem proventum BONAM
 dixere. Hanc a meridie
 oceanum finire voluere no
 stri, sed ego ex recemorum
 historiis colligo, aut p̄icta
 aut sinum hanc ab America
 distinguere.

C Regionem Gigantum vocant
 quod ibi Gigantes cornuti sint
 quos Sáríckhíma dicere.

D Orientaliores sunt. quos
 Sáríckhíma ab unguibus appella
 runt.

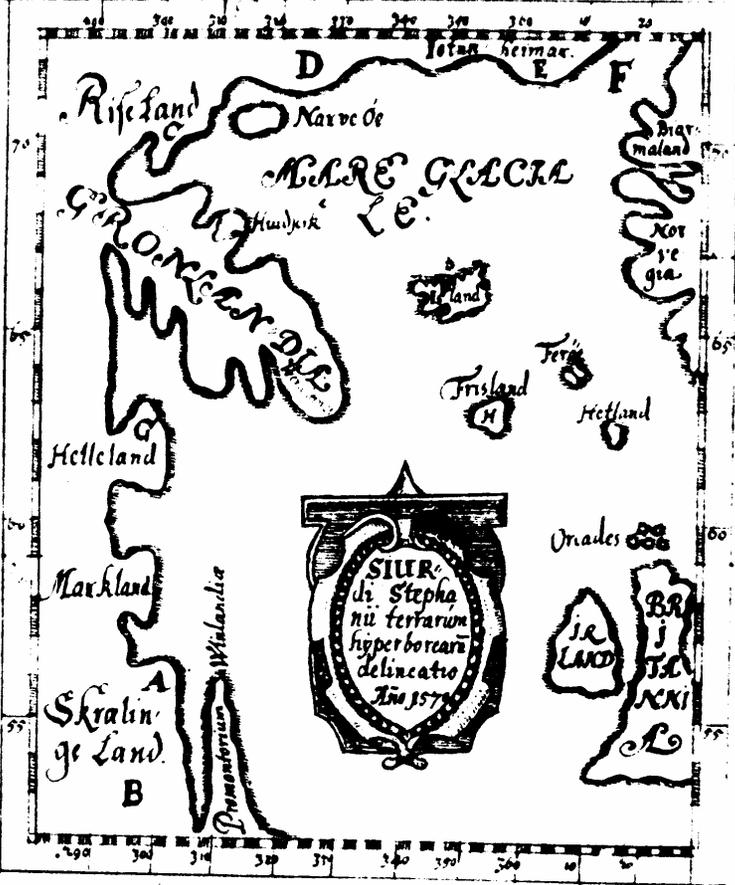
E Jotunheimar idem est
 et regio Gigantum mon
 strorum. hic Regiam
 Gerúthi & Gudmundi fu
 isse existimare licet.

F Sinum hic ingentem intelligimus in Rúsiam excurrentem.

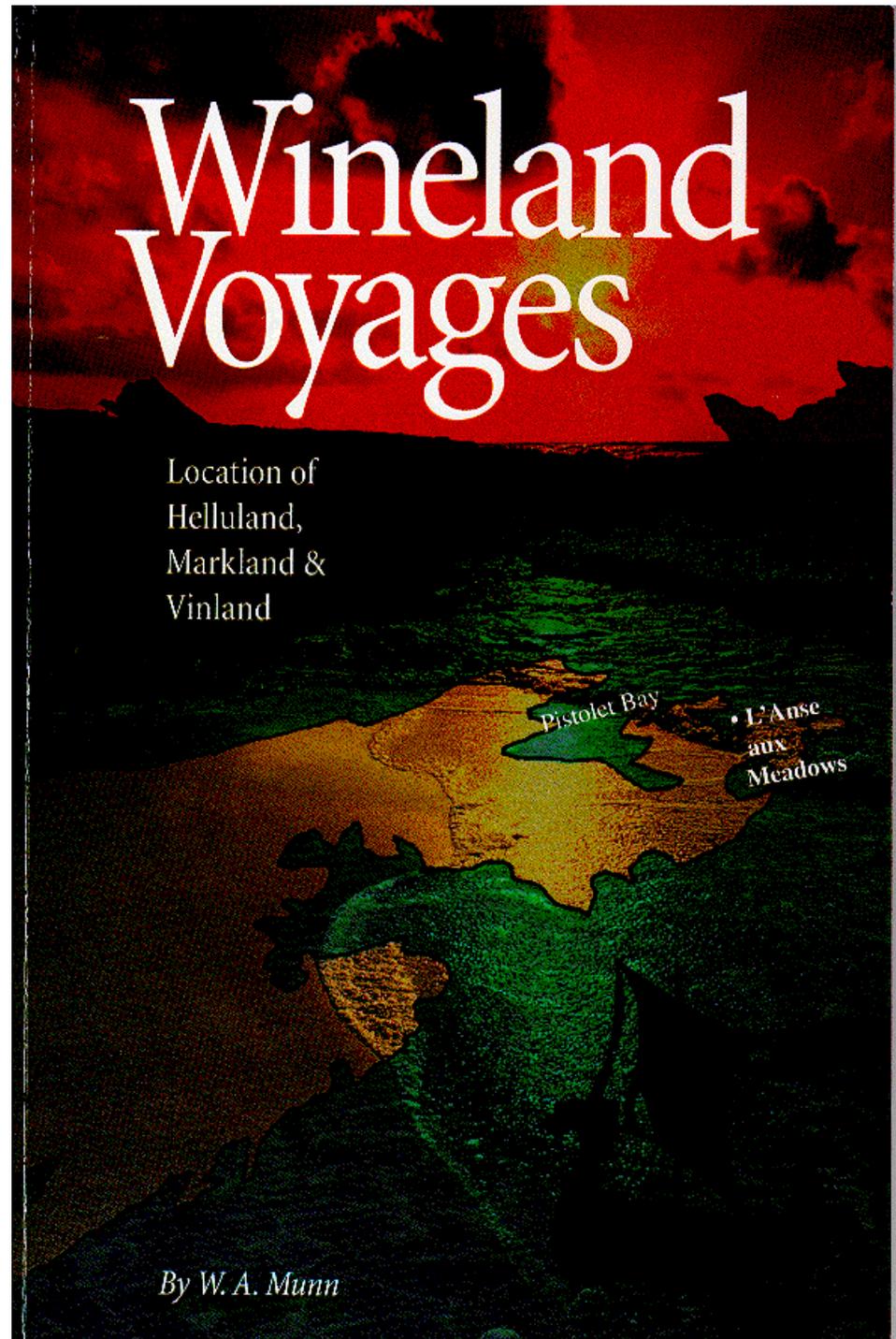
G Regio petrosa. huius in historia saepe fit mentio.

H Hac quae sit insula nescio nisi ea forte quam Venetus ille invenit Frislandiam Germani vocant.

Autor hujus tabellae Geographicae verubetur esse Sigurdus Stephanius Islandicus vir eruditus, Schola
 Scha. nobilita quondam Accior dignissimus, qui etiam alia nonnulla ingenii & eruditionis specimina edidit
 videlicet Descriptionem Islandiae quam apud Sceniff. Regia Maj. Antiquarium Thormodu Torfaur. videtur me
 meminisse, haec non opusculum de Spletis, quod praefertur a toto ad amice quodam in Patria mecum
 communicatum, penes me afferatit. De unicationem autem hanc suam, ex antiquitatis scripturis
 maxima sui parte desumptis videtur. De Hellelandia Marcklandia & Skralingia landia videtur
 p̄terit Arngimus Londi, qui ad calcem opusculi de Gronlandia, Gronlandorum aliquot navigationes
 ad has terras annotavit, in terrarum etiam hyperborearum et ultra Gronlandiam delineatis, ubi
 Hissaland & Jotunheimar collocat, antiquitates quoque Islandicas secirum esse Astorem, sat scio, sed
 an authentica illa sint dubito. Cum priore Gronlandia mappa Dni Gulbrandi parum consentire
 hanc, constat. Islandia hic justo majorem habet latitudinem, Promontorium etiam Danicolum, in
 gentis continentis totius quam Isthris vel promontorii speciem praefert, ut caetera omittam, quoniam
 ea curiositatis potius quam necessitatis ergo hanc mapam annotavi.



A reprint of the pamphlet of W. A. Munn, a native of St. Johns, Newfoundland. He published it in 1914 at his own expense, correctly identifying L'Anse aux Meadows as the landing place of Leif Ericcson in the New World.



**“Wonder Strands”
Cape Porcupine,
Labrador.**

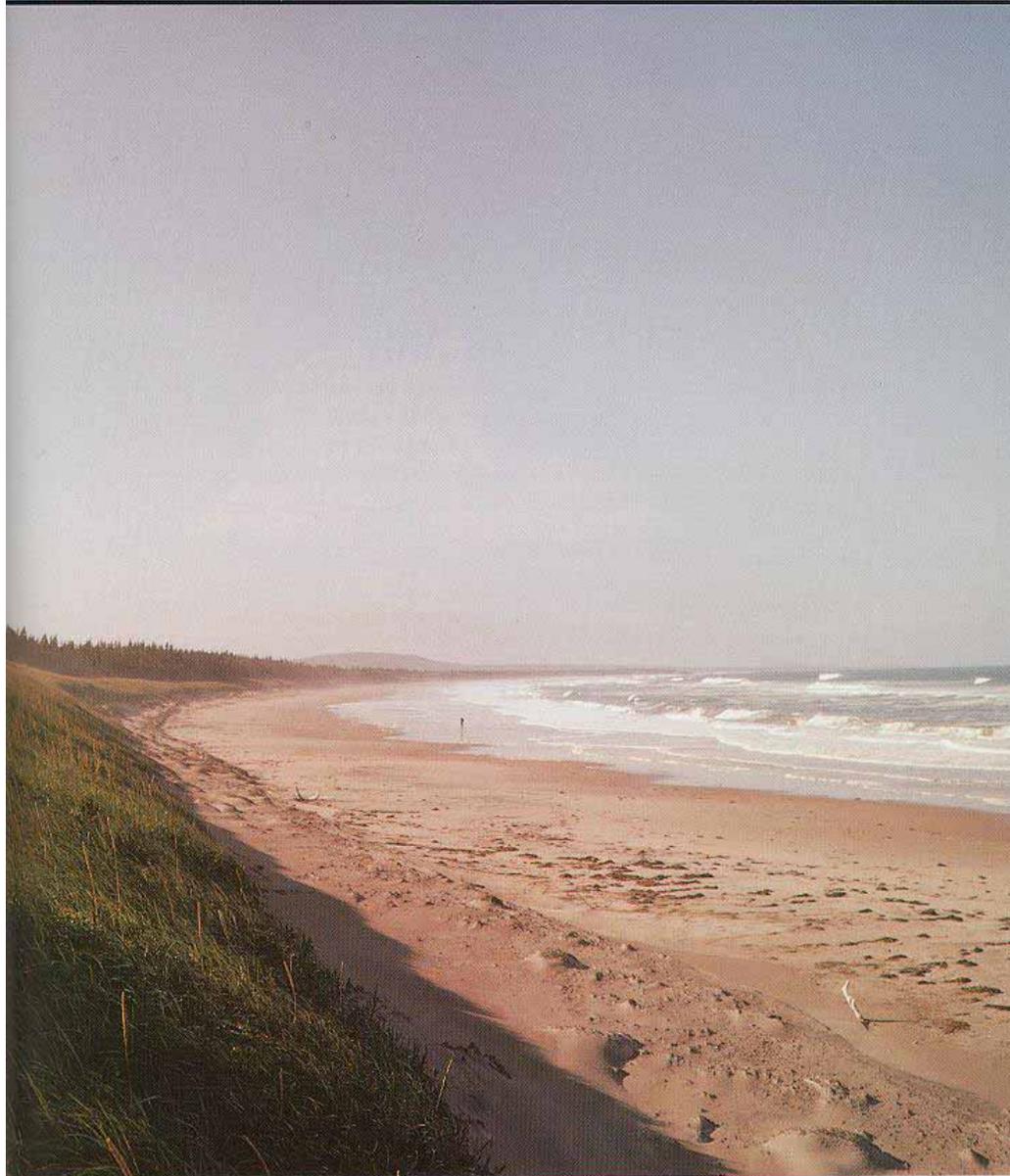
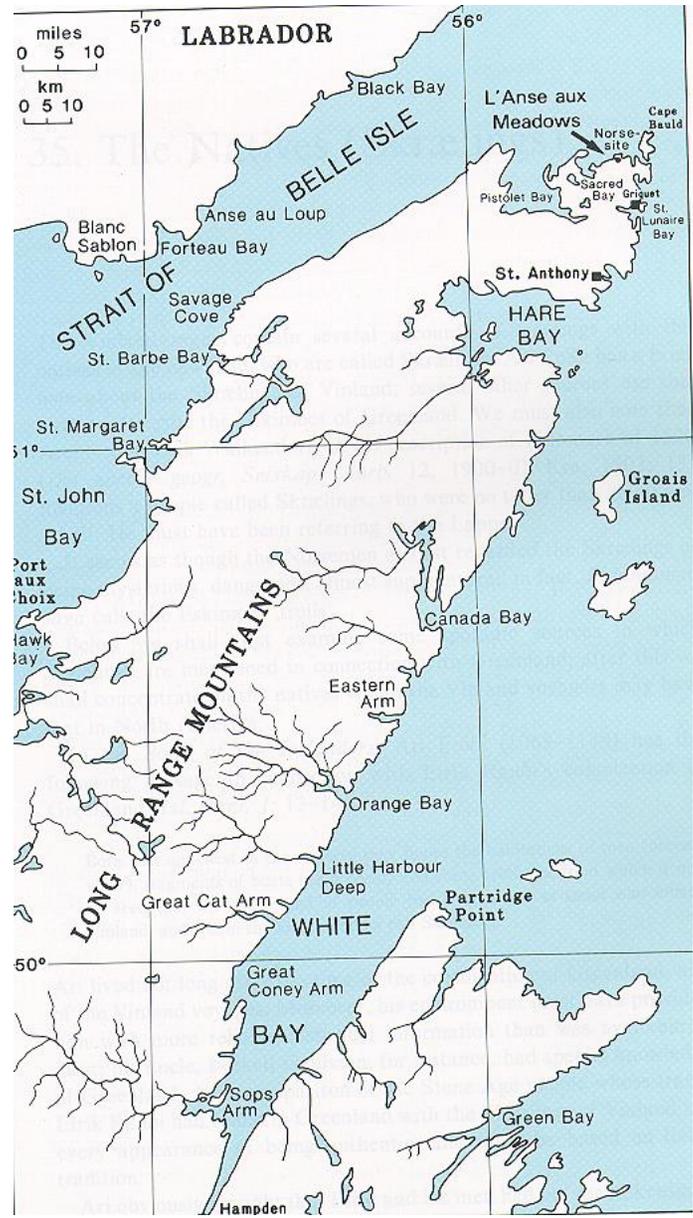


Fig. 44. The extensive beach north of Cape Porcupine in Labrador (Markland). This must be the long beaches of the sagas.

**The northern
Peninsula of
Newfoundland and the
Strait of Belle Isle.**





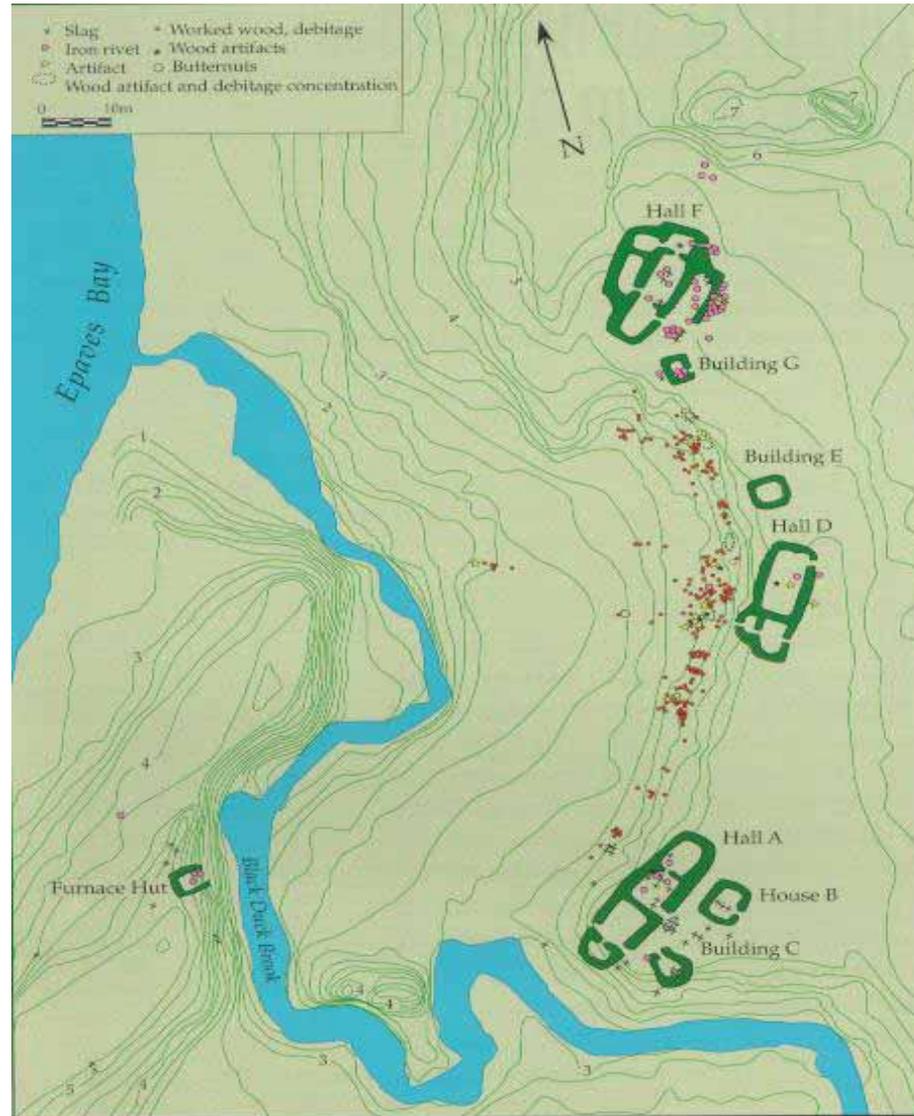
From the Groenlendinga Saga: Leif Eiriksson's Landing in Vinland, Discovery of America

..... they went back to their ship and sailed into the sound that lay between the island and the headland jutting out to the north.

They steered a westerly course around the headland. There were extensive shallows there and at low tide their ship was left high and dry, with the sea almost out of sight. But they were so impatient to land that they could not bear to wait for the rising tide to float the ship: they ran ashore to a place where a river flowed out of a lake. As soon as the tide had refloated the ship, they took a boat and rowed out to it and brought it up the river and into the lake, where they anchored it. They carried their hammocks ashore and put up booths. Then they decided to winter there, and built some large houses.



General Map of L'Anse aux Meadows Excavations



14.2 L'ANSE AUX MEADOWS

SITE PLAN

The layout of the Norse settlement along the terrace east of Black Duck Brook gives clear evidence of a planned community. Outbuildings associated with each of three dwellings, and a furnace hut dug into the bank of the brook, indicate three social groups that were probably organized around three vessels.

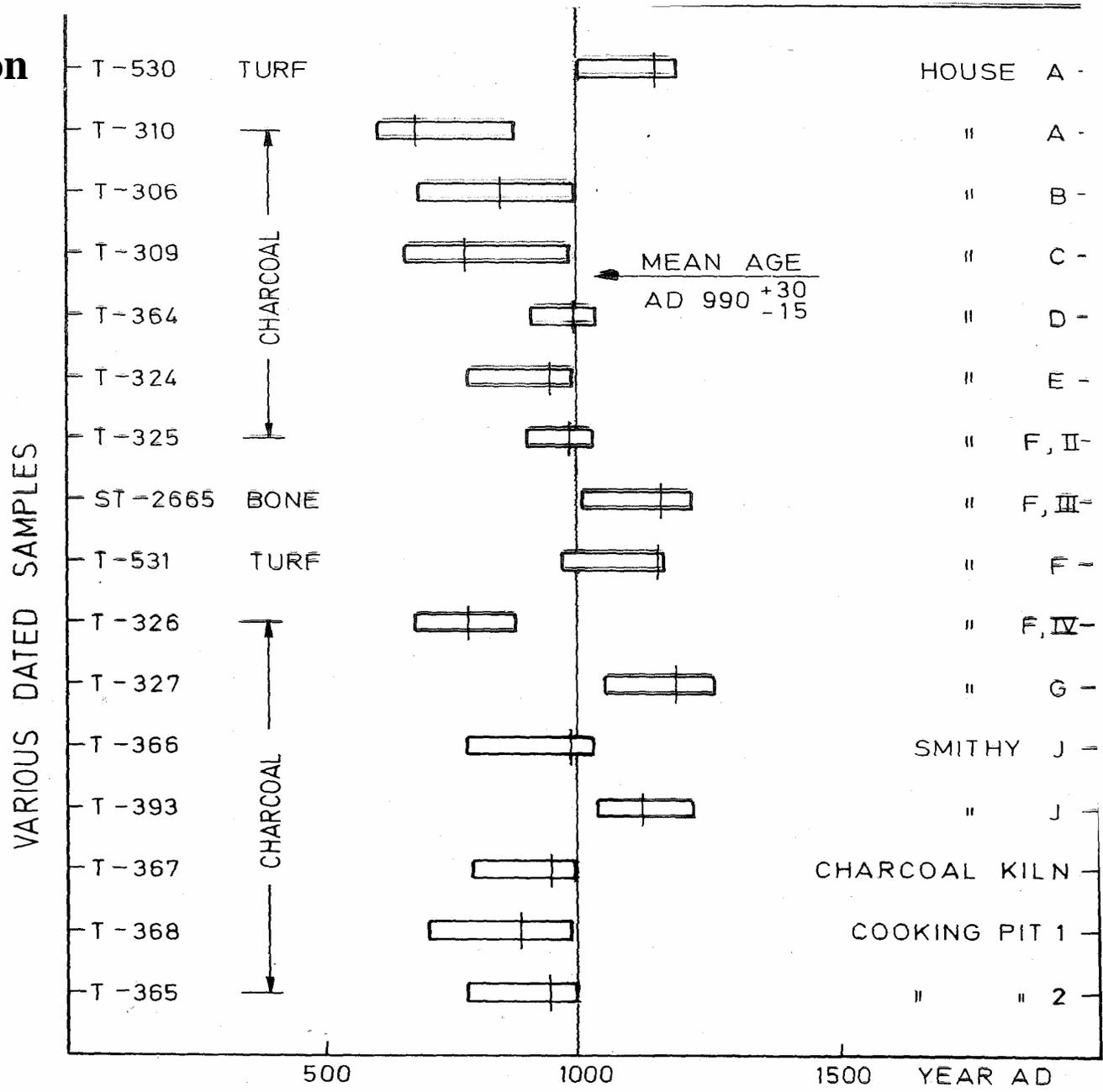
artifacts, and the style of architecture. Of 141 radiocarbon dates from L'Anse aux Meadows, most are associated with native occupations, but about fifty pertain to the Norse occupation. Their time spread is a good illustration of why radiocarbon dates cannot always be taken at face value. A stake of balsam fir within the Norse deposits had a date of A.D. 980 (1070±75 BP converted to calendar years and midpoint of Stuiver cali-

**Conclusive
Evidence of
Viking presence
at L'Anse aux
Meadows**



Fig. 5. The ring-headed pin of bronze from house-site A *in situ*. Scale 1:1.

Radiocarbon Dendro- corrected Dates

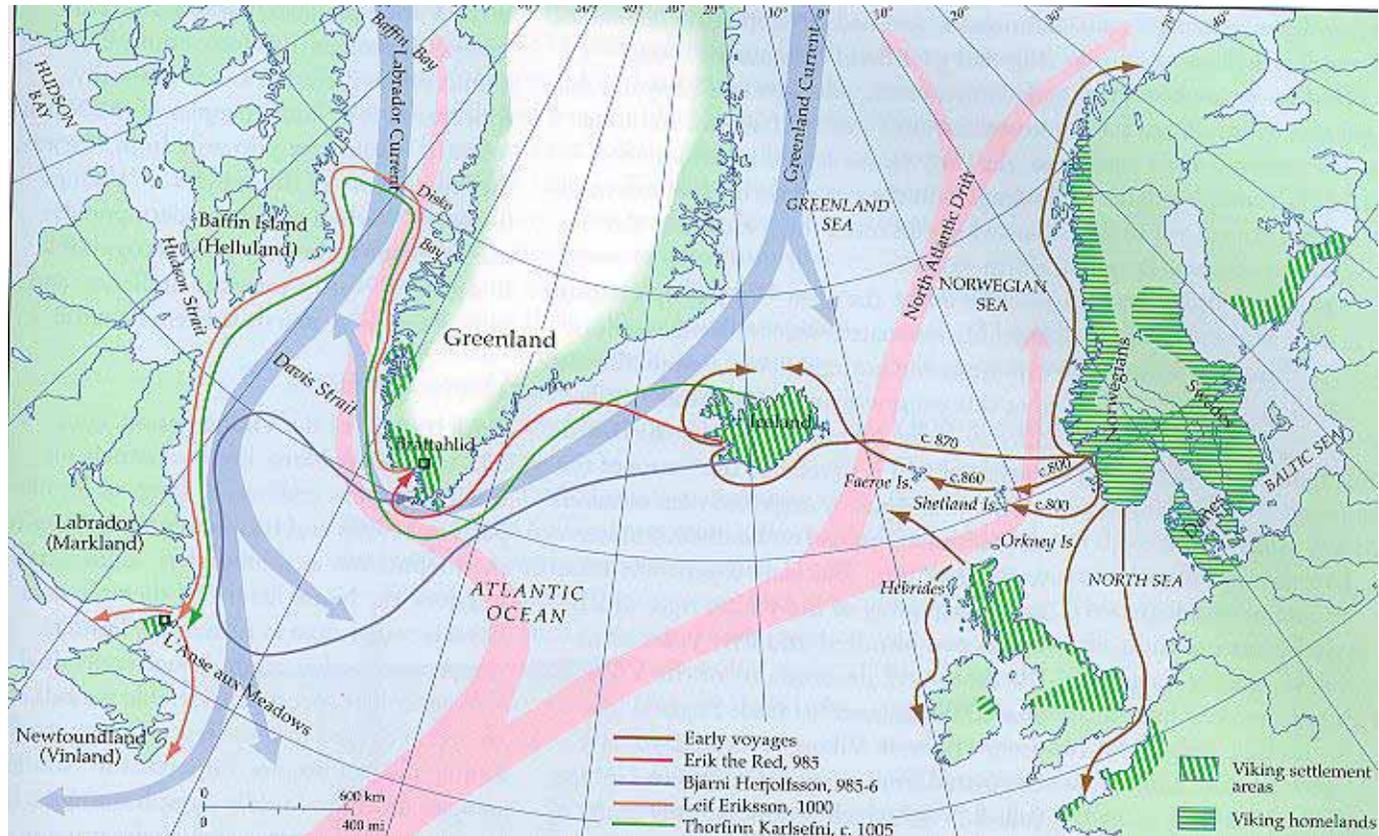


L'ANSE AUX MEADOWS SERIES

**Viking long
house at
L'Anse aux
Meadows**



Viking Voyages in the North Atlantic ca. 1000 AD

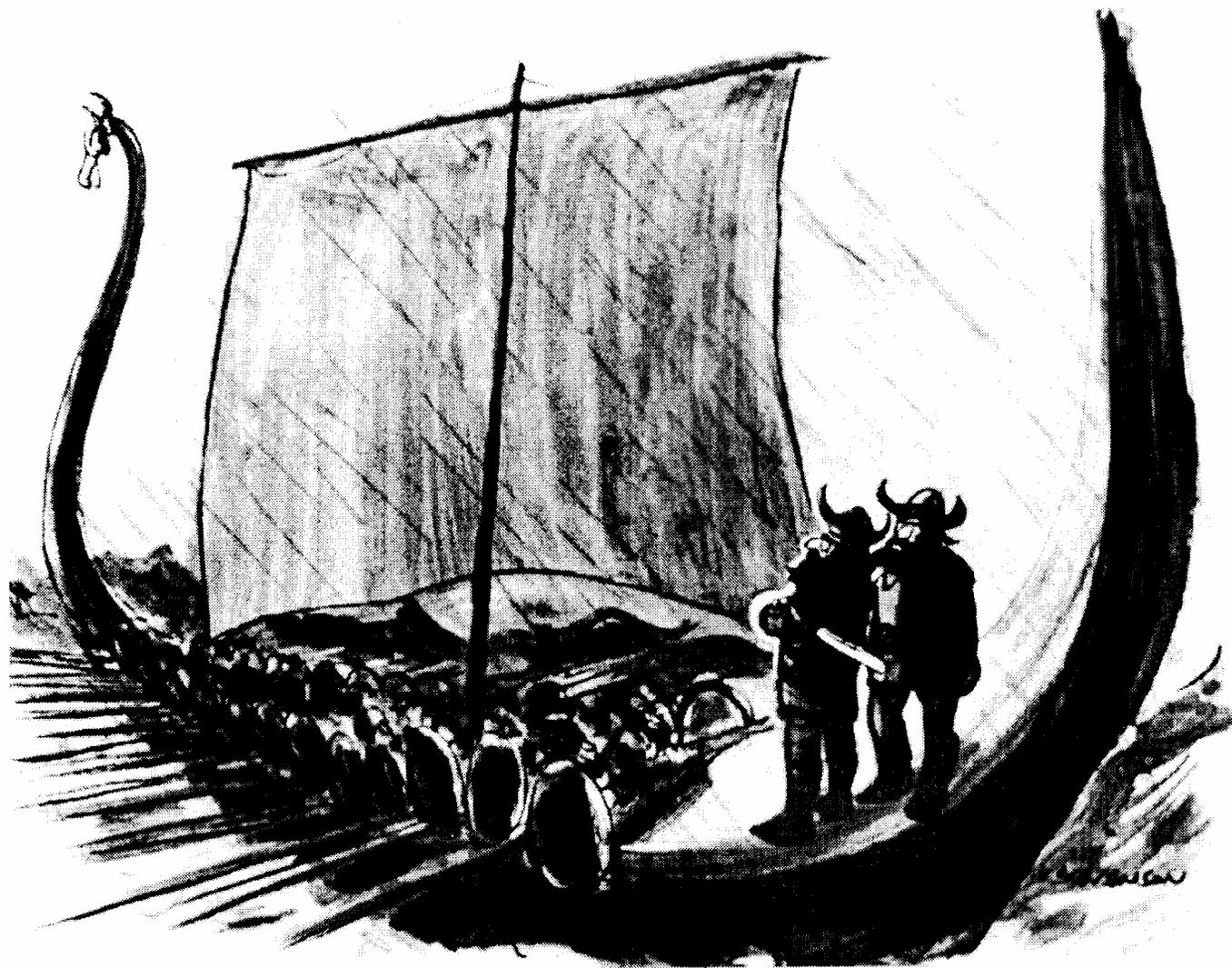


Warm currents shown in Pink, Cold Currents in Blue

Archaeological discoveries related to the presence of Norse, their voyages, and trade with native populations in the Far North. The dot on Ellesmere Is. marks “Skraling Island” Peter Schledermann.



NORSE ARTIFACTS IN NORTH AMERICA



“Let’s take another look at that damn map.”

The New Yorker

Carbon 14 Dating the Vinland Map

Principal Investigators

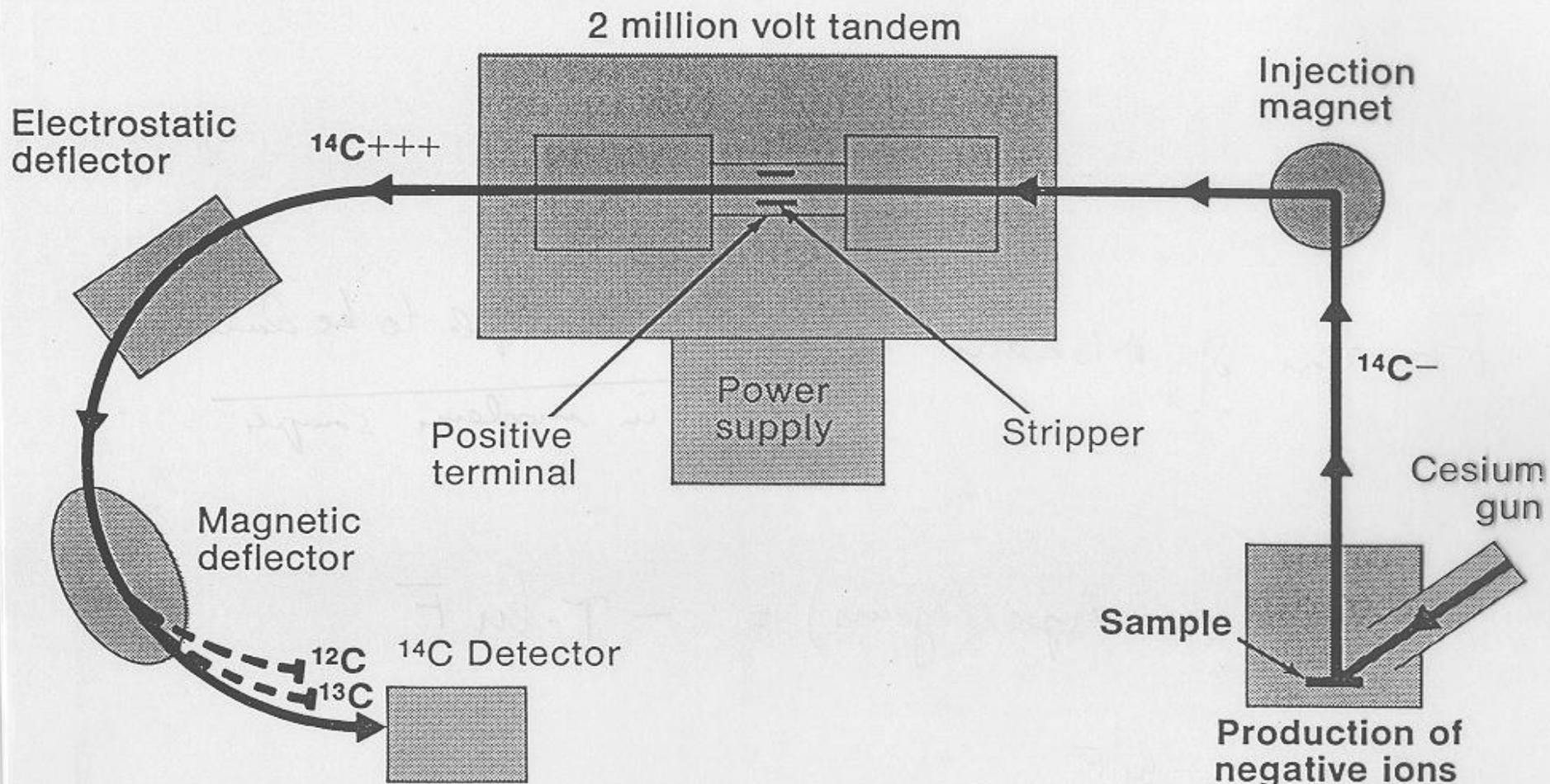
Garman Harbottle **Chemistry Department, Brookhaven National Laboratory
and Department of Geosciences, Stony Brook University**

Jacqueline Olin **Conservation Analytical Laboratory, Smithsonian
Institution and National Institute of Standards and
Technology**

Douglas J. Donahue **National Science Foundation AMS Facility and
Department of Physics, University of Arizona**

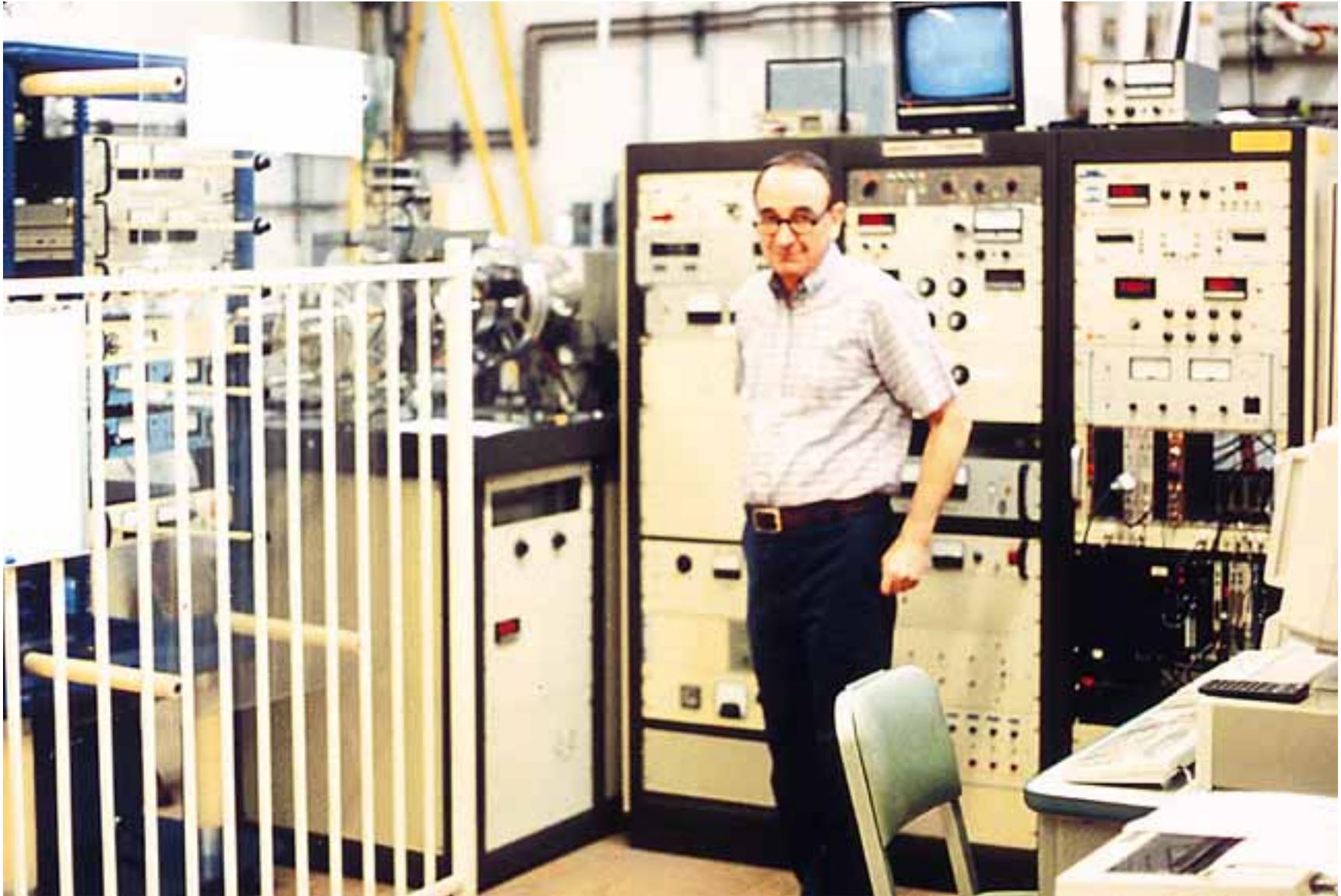
Project Associates

**Diane Van Der Reyden, Smithsonian, Steve Choquette, NIST, Michelle Schantz,
NIST, T. Lange and A.J.T. Jull, NSF AMS Facility, University of Arizona**



In the University of Arizona tandem accelerator mass spectrometer, the sample in the form of aluminum carbide is bombarded with a cesium beam, producing ions. Negative ions with an atomic mass of 14 pass through an injection magnet into the accelerator. There they are accelerated towards a positive terminal at 2 million volts. At the terminal, ions pass through an argon stripper, which removes electrons to produce ions with a charge of +3. The positive ions are repelled from the terminal and are further accelerated until they have a kinetic energy of 6 million volts as they exit. After passing through electrostatic and magnetic field analyzers, the ions enter a detector, which measures both energy and rate of energy loss

Douglas Donahue at the NSF Accelerator - Mass Spectrometer, University of Arizona



Radiocarbon Age and Fraction of Modern

Determination of the Radiocarbon Age

- (1) The "Fraction Modern" F is the ratio $^{14}\text{C}/^{13}\text{C}$ in the sample compared to the same ratio in a modern (1950 AD) standard.
- (2) Measurements of $\delta^{13}\text{C}$ of the sample are made in a mass spectrometer, permitting the Fraction Modern F to be normalized to $\delta^{13}\text{C} = -25.0$ per mil.
- (3) The Radiocarbon Age is calculated from the equation:

$$\text{Radiocarbon Age} = -\tau \ln F$$

where τ is the Libby mean life, 8033 years, and $\ln F$ is the natural logarithm of F . The mean life is the half-life divided by $\ln 2$ (~0.693)

Calibration curve to convert conventional “Libby” radiocarbon ages to dendro-corrected calendar dates

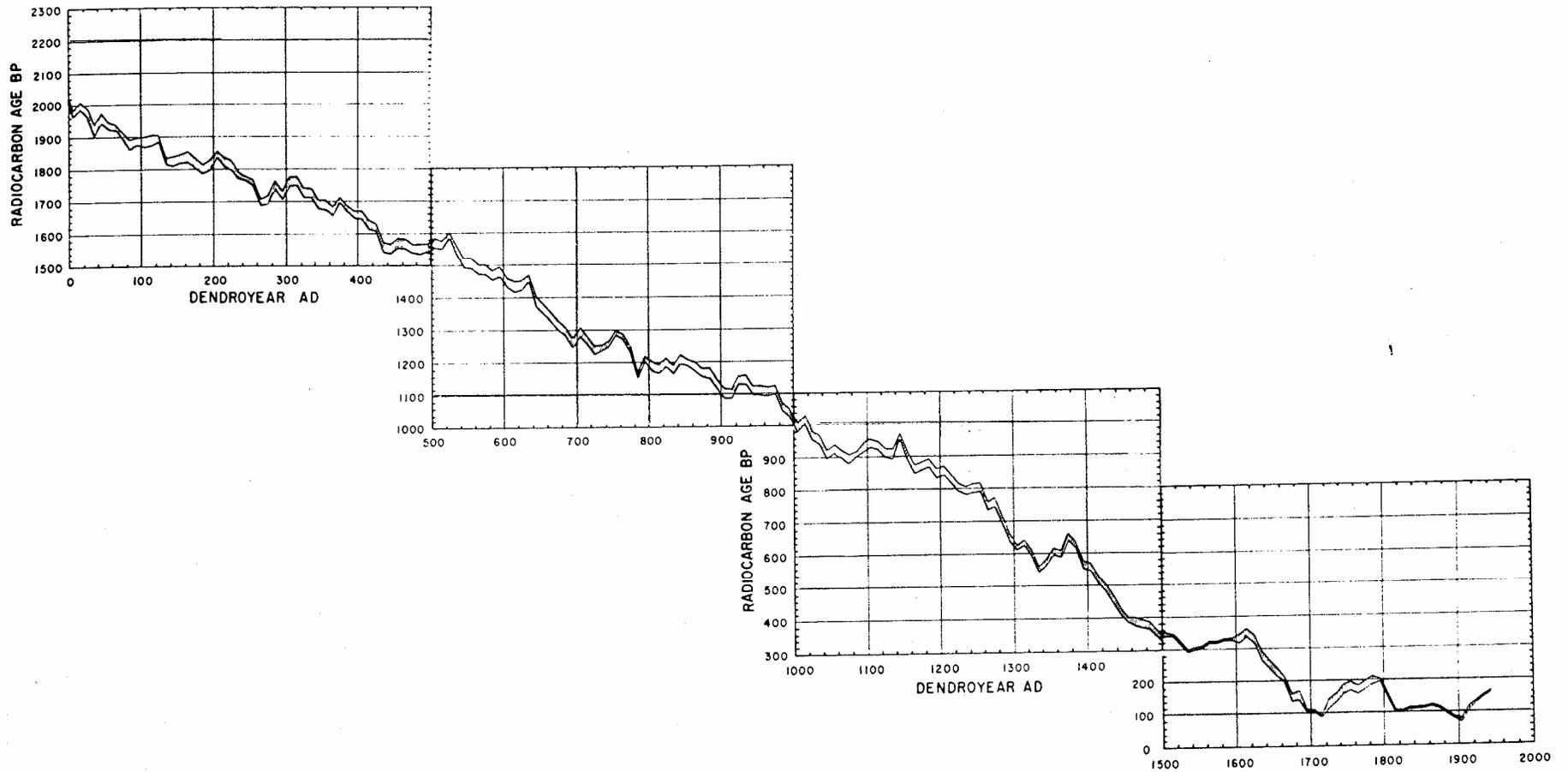


Fig. 1. The Stuiver¹ calibration curve for conventional radiocarbon dates.

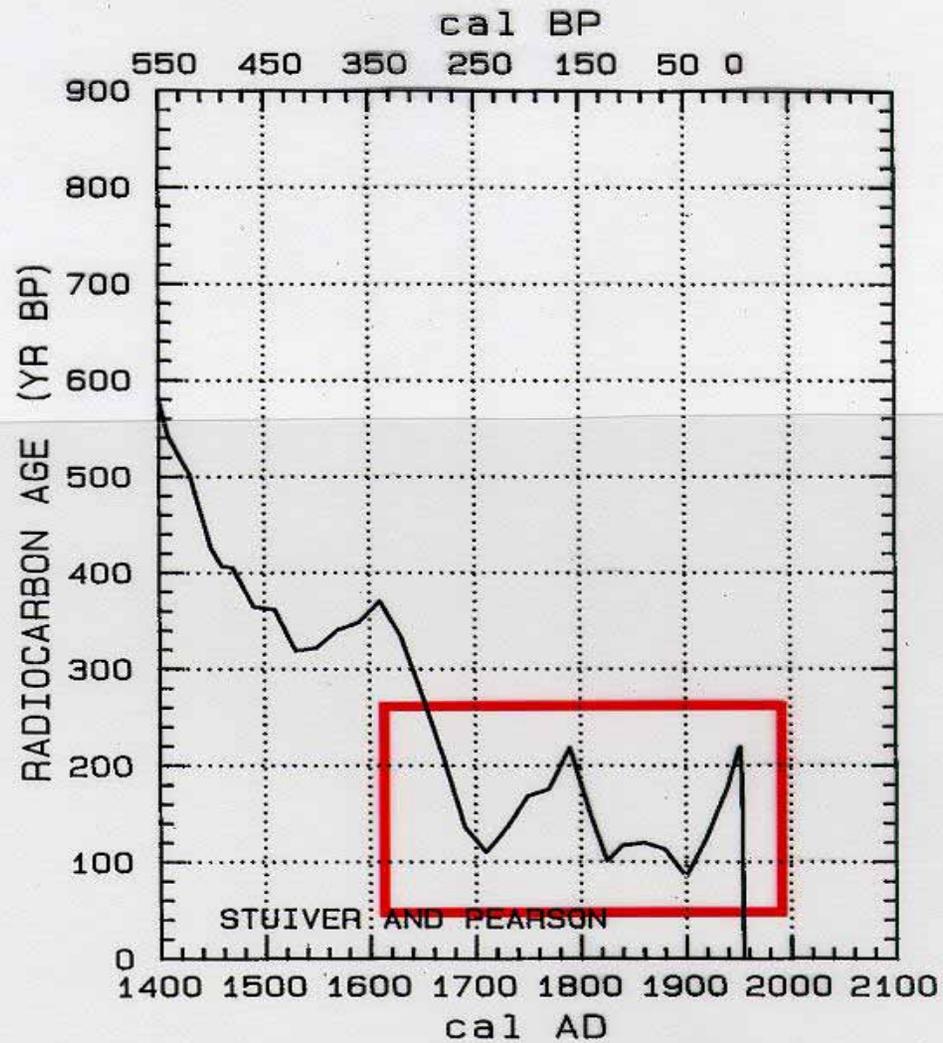


Fig. 1A-L. ^{14}C calibration curve derived from bidecadal samples, with single-year AD 1951–1954 data added to complete the pre-nuclear bomb era

Horizontal Axis : Calibrated date
 Vertical Axis : Age in Radiocarbon years

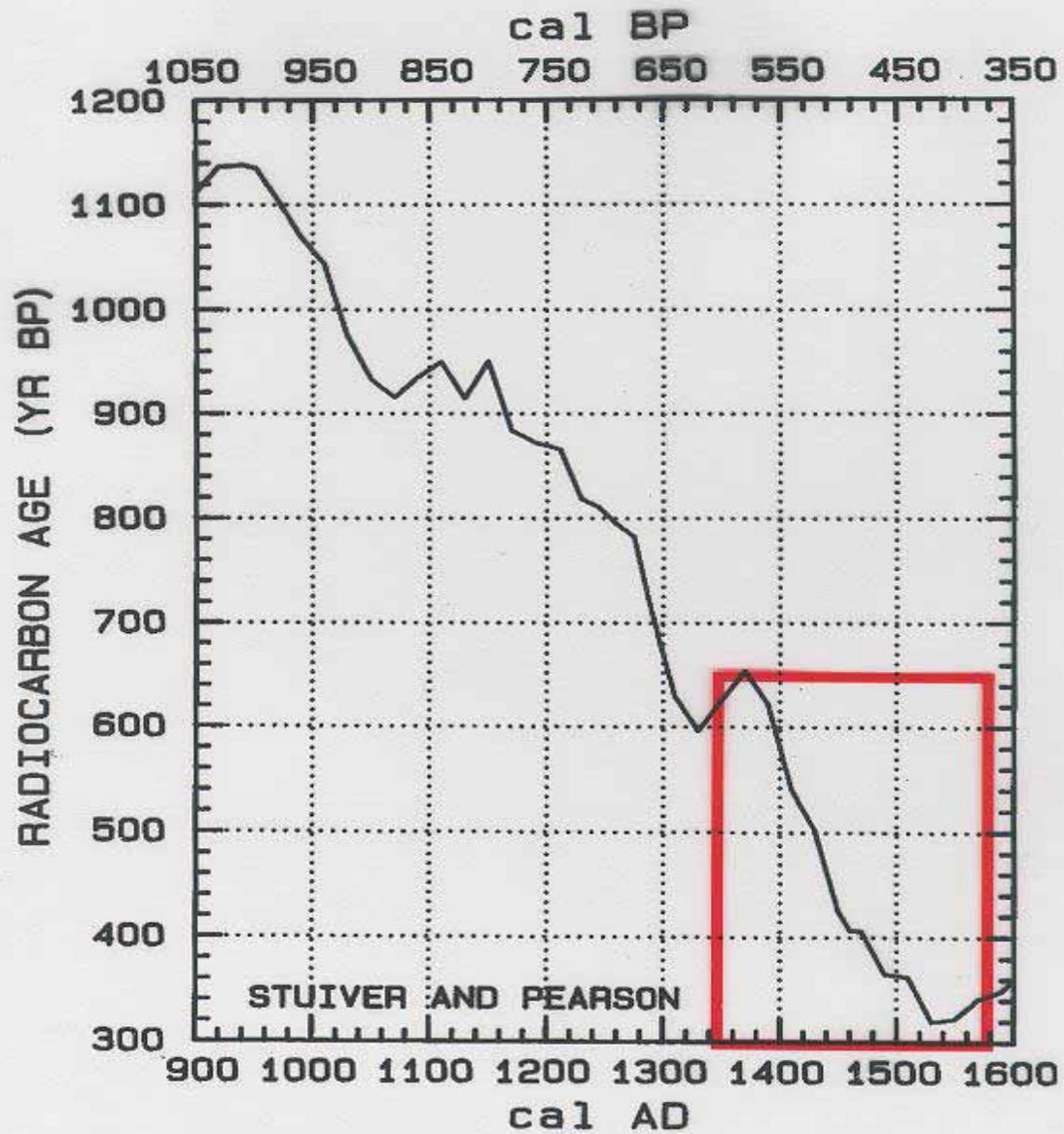


Fig. 1B

Vertical Axis : Radiocarbon Age in years
 Horizontal Axis : Calibrated calendrical date AD

Yale's "Final Exam" for the Vinland Map Radiocarbon Dating Project. This earned a passing grade.

Calibrated dates are 1- σ calendar ranges.

Results of Radiocarbon Measurements
on Parchment Samples of Known Age from the
Beinecke Library (Florentine Notary Documents)

Sample	$\delta^{13}\text{C}$	Actual Date	^{14}C Age Years	Calibrated Date
13406	-21.8	12/24/1434	405 (23)	1445-1475
13407	-23.5	7/12/1446	430 (24)	1435-1460
13408	-22.7	1/04/1457	399 (23)	1445-1480
13409	-22.8	9/27/1495	313 (22)	1520-1635

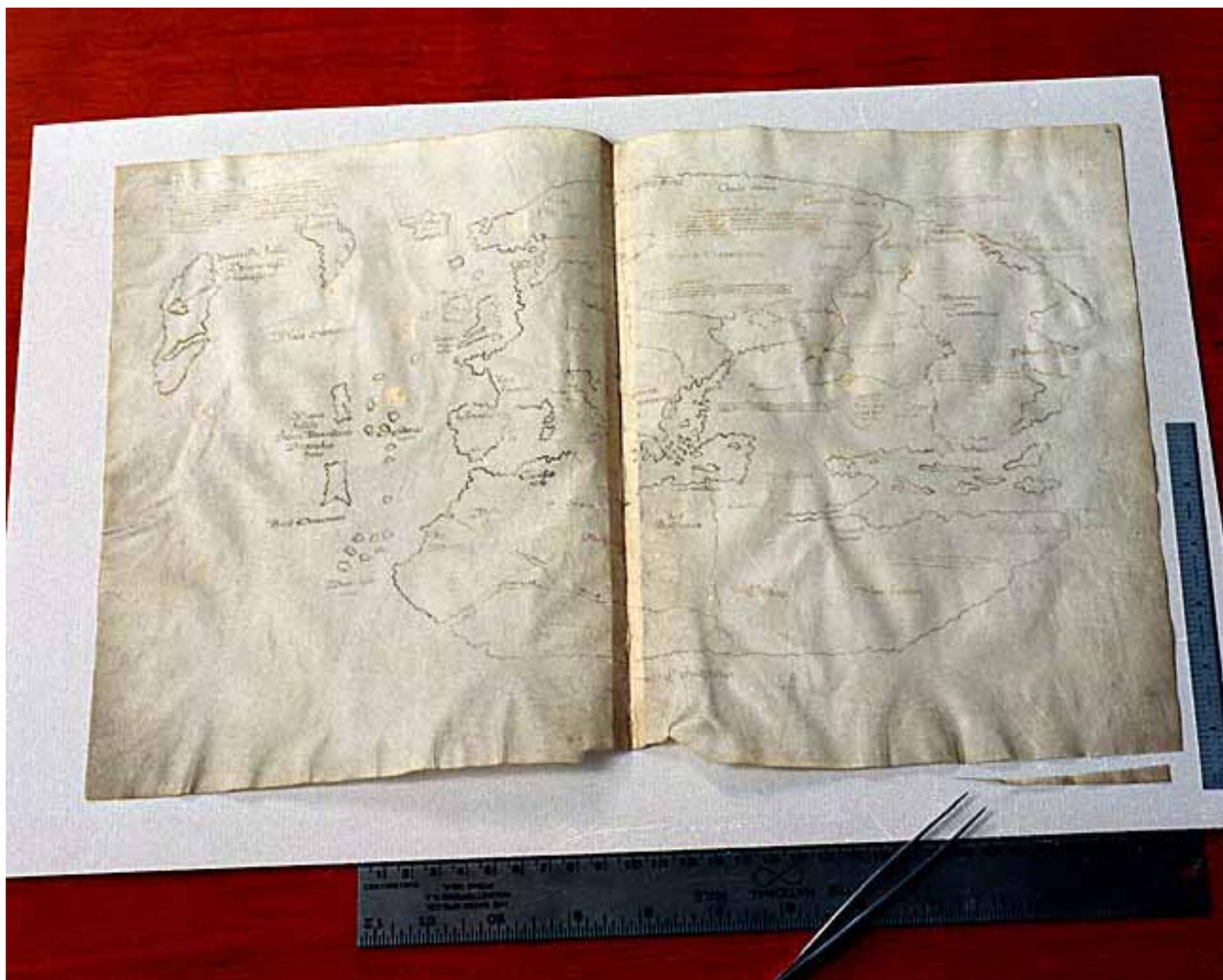
All results are normalized to $\delta^{13}\text{C} = -25\text{‰}$

Calibrated ages: Stuiver & Pearson

Radiocarbon 28, 805 - 838 (1994)



The Vinland Map, Beinecke Rare Book and Manuscript Library, Yale University, 1995



Weighing the sample cut from the Vinland Map



The weight taken startled us all, 28.9 milligrams. We had intended to take about 16 - 18 milligrams.



Corner of Vinland Map, with sample removed





**Radiocarbon Measurements on the Vinland Map
Individual Parchment Samples
July, 2001**

Lab. number	Chemical process	Dates	Mass, mg.	Δ 13C per mil	Number of runs	Average Fraction of modern	Standard deviation +/-
V12013	A	5/95	0.86	-21.47	2	1.0176	0.005
J21A	B	5/95	1.36	(-21.9)	2	0.9588	0.014
J21C	B	6/95	0.62	-21.89	3	0.9507	0.0035
T5087	C	4/96	0.7	(-21.9)	2	0.9353	0.006
T12802	D	3/01	0.69	-21.91	2	0.9412	0.003
J44	E	9/95	0.25	-23.3	2	0.9310	0.008

- Process A** "Standard" acid-base-acid (ABA) dil HCl, dil NaOH, dil HCl, rinse water.
B Before ABA, wash in acetone ultrasonic, 1 hour. Samples lose 20 - 30%
C Same as B, but 2X acetone wash. Samples lose 30% in first wash, 0% in second.
D Wash 3X in acetone. Weight loss 22%, 0%, 0%. Collagen fraction extracted and measured for C14.
E Only acetone, but acetone was 99% C13. Less than 1 atom of carbon per million retained in target from acetone carbon.

Calibration of Radiocarbon Dates of the Vinland Map Parchment July, 2001

The weighted average of all samples excluding Process “A” :

$$\text{Fraction of modern} \quad F = 0.9434 \pm 0.0033$$

The radiocarbon age is given by $\text{age} = -\tau \ln F$
 $= 467 \pm 27 \text{ years BP}$

where τ is the Libby mean life, 8033 years

The radiocarbon age is converted to a calendar date by the 1998 atmospheric tree-ring data set (Stuiver et al., Radiocarbon 1041-1083, (1998)).

One sigma AD 1423 - 1445 or AD 1434 \pm 11 years

Two sigma 1411 - 1468 (95% confidence)

The coating on the map and what it means

Our first C14 measurements were made in 5/95, shortly after the sampling at Yale. We were shocked when the two samples gave dates of 2083 and 2085 AD. We were seeing “bomb” C14 from the atmospheric testing in the 1950’s.

We found that the high - C14 contaminant was removable with acetone: it amounted to +/- 30 % . The residual parchment dates were in the 1430 - 1440 AD range, and very consistent, regardless of number of acetone extractions.

Experiment with ^{13}C -labelled acetone showed no exchange (to 1 ppm).

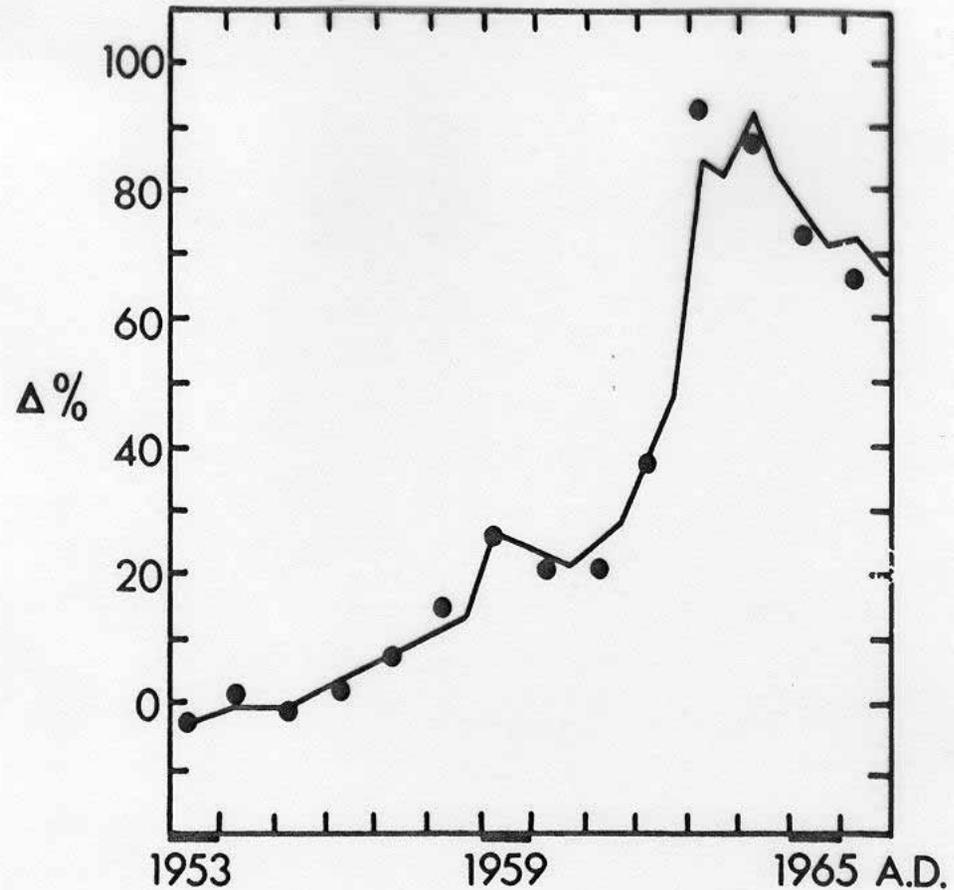
After 1950, the C14 in the atmosphere nearly doubles by 1961, when Pauling gets his worldwide moratorium and for this wins his second Nobel, the Peace Prize.

The single-malt Scotch whisky experiment (!!) lets us date the coating.

Could be silicone oil ($[\text{Si}(\text{CH}_3)_2 - \text{O}]_n$) or linseed oil, or something else.

**Abrupt rise in environmental carbon 14 caused by nuclear test explosions, reflected in the ^{14}C labelling of alcohol in vintage single malt whiskies. (rationale: all alcohol comes from grain from a single year)
Solid line: carbon dioxide (atmospheric) data.**

Points = whiskies



Correlation between ^{14}C -concentrations in atmospheric carbon dioxide and in vintage whiskies (data marked in solid circles) (reference 9).

History of the Vinland Map (4)

1985. Cahill and Kusko, using PIXE, find only nanograms/cm² of titanium, 10,000 x less than McCrone, and much in line with hundreds of other medieval documents. McCrone threatens lawsuit.

1991. Harbottle attends conference at Hunter College, NY. Suggests dating the parchment of the VM. Recruits Olin (Smithsonian). Three successive proposals are rejected by Yale. They recruit Donahue (Arizona). Proposal accepted, 1994-5.

1995 (February). Harbottle, Olin and Donahue, with Pooley and van der Reyden, slice 28.6 mg from lower right corner of VM. Carbon 14 dating at NSF center at University of Arizona.

2002 (August). Date, 1434 +/- 11 AD published in “Radiocarbon”.

History of the Vinland Map (5)

September 2002: Brown and Clark (London) publish in “Analytical Chemistry” anatase (again) and carbon in ink. Fake! Double whammy!! Frantic email exchanges pick up “controversy”. Every interested party touts his/her favorite theory. NYTimes story cites Kirsten Seaver’s theory of Fischer Forgery: anti-Nazi motive. MSNBC viewers vote online: 37% “authentic”, 24% “forgery”.

A third Conference on the Vinland Map seems inevitable.

More “scientific” studies? Yale seems amenable (Yale Daily News)

The “anatase” bogeyman looks more and more like a red herring. Contrary to earlier belief, anatase TiO_2 is everywhere in nature.

History of the Vinland Map (6)

2004. Gregory G. Guzman, professor at Bradley University and distinguished scholar investigating the work of Medieval historian Vincent of Beauvais, discovers a second copy of the “Tartar Relation” - “Vincent of Beauvais” combined volume in the “Zentral und Hochschulbibliothek, Luzern, Switzerland.

2004. Cahill measures silicon content of Vinland Map parchment.

Arguments for authenticity of the Vinland Map

Paleography: VB, VM and TR all the work of one scribe. “Oberrheinische bastarda” typical of Basle, mid 1400’s.

Watermarks on paper of VB and TR, bull + cross, mark of “Muhle zu Allen Winden, 1433, near Basle.

Binding appropriate for German, mid 1400’s. Wormholes in VM, VB, TR align.

Offset in pastedown (discovered in 1965) refers to Council of Basle, 1435.

Precision radiocarbon date of VM parchment: 1434 (+/- 11) AD.

Ink analysis (PIXE) within range of 15th century inks.

Arguments for forgery of the Vinland Map

Lack of provenance before 1955. Map “looks wrong” to experts.

“Accurate” depiction of Greenland, shown as an island. “Impossible”, in 1430’s. No-one had circumnavigated Greenland in 1430. “Accurate representation of coastline of Greenland”

Unusual usages of Latin in text of map.

McCrone, (microscopy) and now Brown and Clark (IR-Raman) analysis of ink on map. Titanium dioxide in form of anatase. “Anatase only available after 1923” therefor map is a forgery. Brown and Clark see anatase with IR-Raman, also carbon.

Archaeological discoveries related to the presence of Norse, their voyages, and trade with native populations in the Far North. The dot on Ellesmere Is. marks “Skraling Island” Peter Schledermann.



NORSE ARTIFACTS IN NORTH AMERICA

COLUMBUS HAD A NORWEGIAN MAP

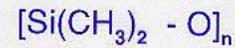


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Bumper Sticker seen in Minnesota

The Story of the Silicone

Before the Vinland Map reached Yale University in 1957, it was apparently impregnated with silicone oil, perhaps to increase the adherence of the ink particles to the parchment. One form of silicone oil has the approximate formula:



Measurement of the masses of parchment before and after acetone extraction indicate that approximately 30% of this foreign material (silicone) may be present. (It was shown that the acetone was inactive in a separate experiment.) Presumably this foreign material is responsible for the post-bomb ^{14}C observed in samples 1 and 2.

If we assume that the silicone and the parchment have about the same fractional content of carbon, then we can make a rough calculation of the fraction of modern ^{14}C present in the foreign material, making use of the results of samples 1 & 2, where it was not removed.

$$F(\text{samples 1 \& 2}) = 0.3F(\text{silicone}) + 0.7F(\text{parchment})$$

From this we can calculate

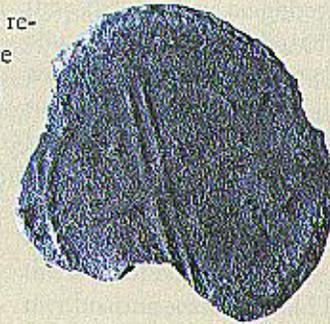
$$F(\text{silicone}) = \text{ca. } 1.2$$

We then refer to a post-bomb calibration curve (the Scotch Malt Whiskey curve or that of T. Lange) to find that the silicone has a ^{14}C level appropriate to 1957 - 1958. In other words, the map was treated with the foreign material very shortly before it entered the rare-book collection of Yale University.

**The “Maine Penny” found
at the “Goddard Site”, minted
in Norway / King Olaf Kyrre,
1065 - 1080 AD**

coast travels within view of the site, and during the summer it is a rare day when large yachts or sailing schooners are not in view.

Mellgren and Runge returned to the Goddard site in March of the following year, digging in still-frozen ground, and every year for the next twenty-two years, spending a



MAINE PENNY

This small coin, minted in Norway between 1065 and 1080 during the reign of King Olaf Kyrre, was excavated on the coast of Maine in 1957. It probably arrived at the Goddard site from Newfoundland or Labrador by way of native trade networks. A small hole had been drilled on one edge, suggesting it had been worn as a pendant or a clothing ornament.

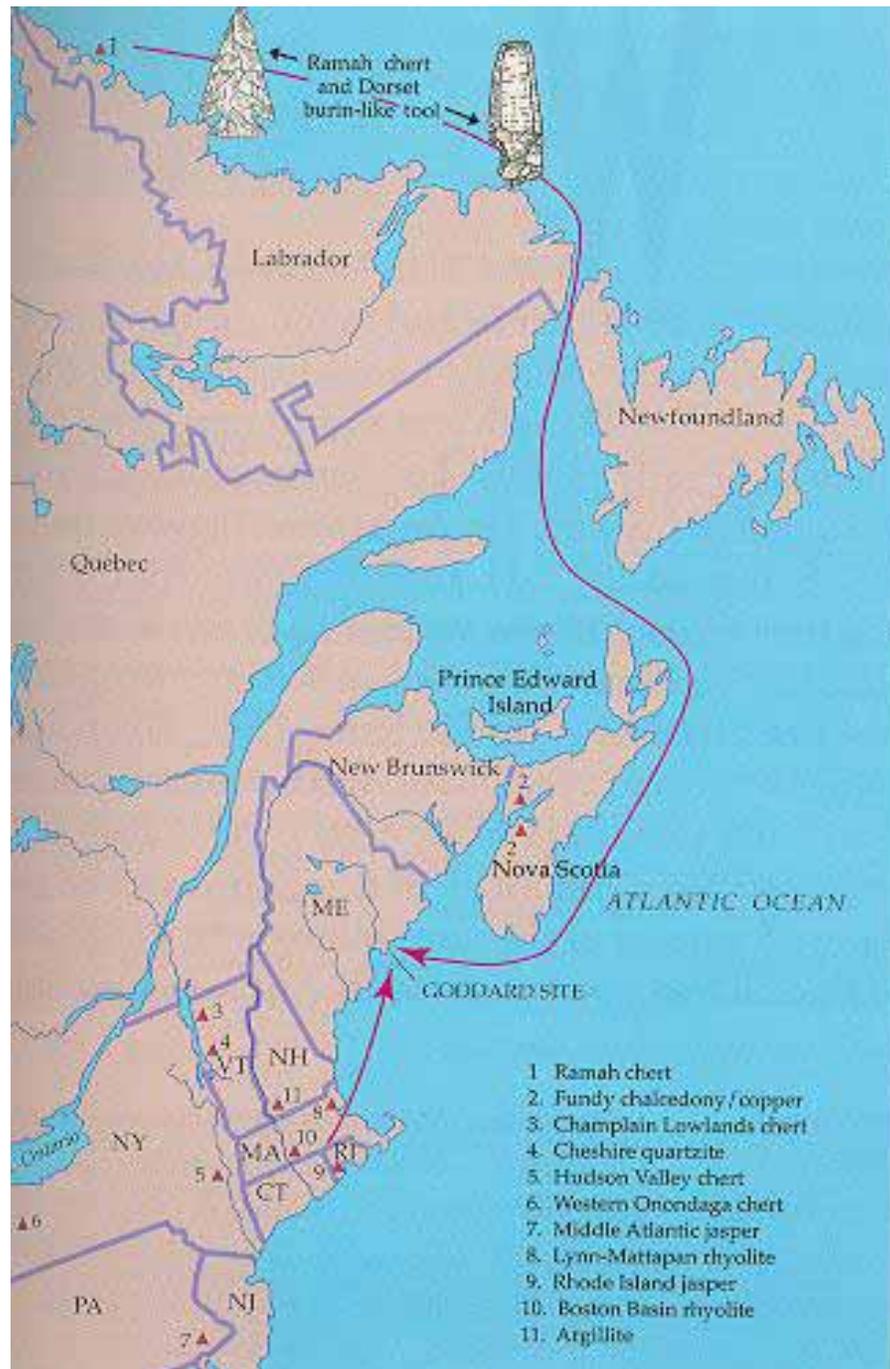






Vinland map

**Provenance of the
Chert Artifacts from
the Goddard Site,
Maine.**

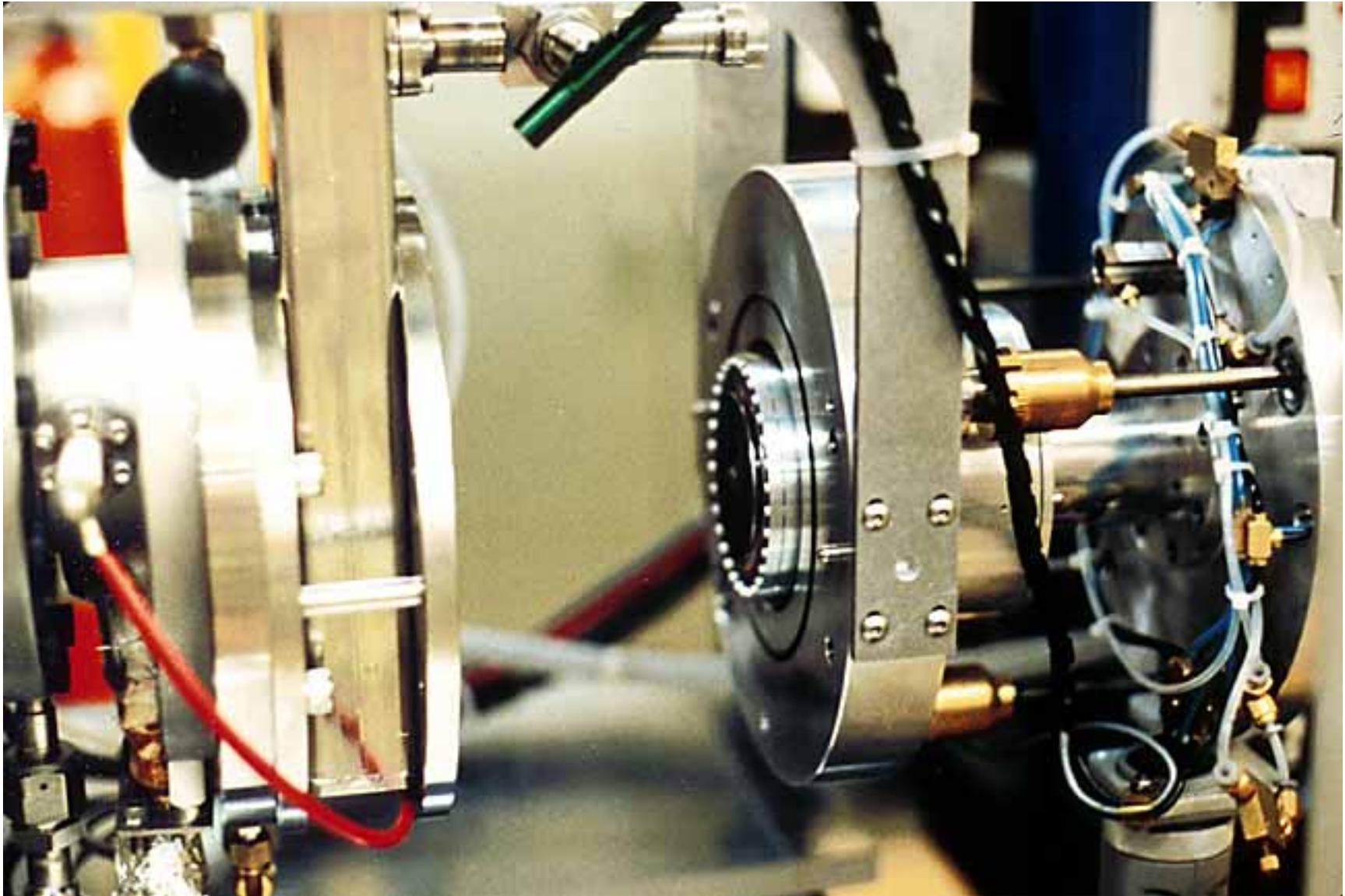


The most important discovery in the early excavations at L'Anse aux Meadows: the "ring-headed pin" of purely Viking design

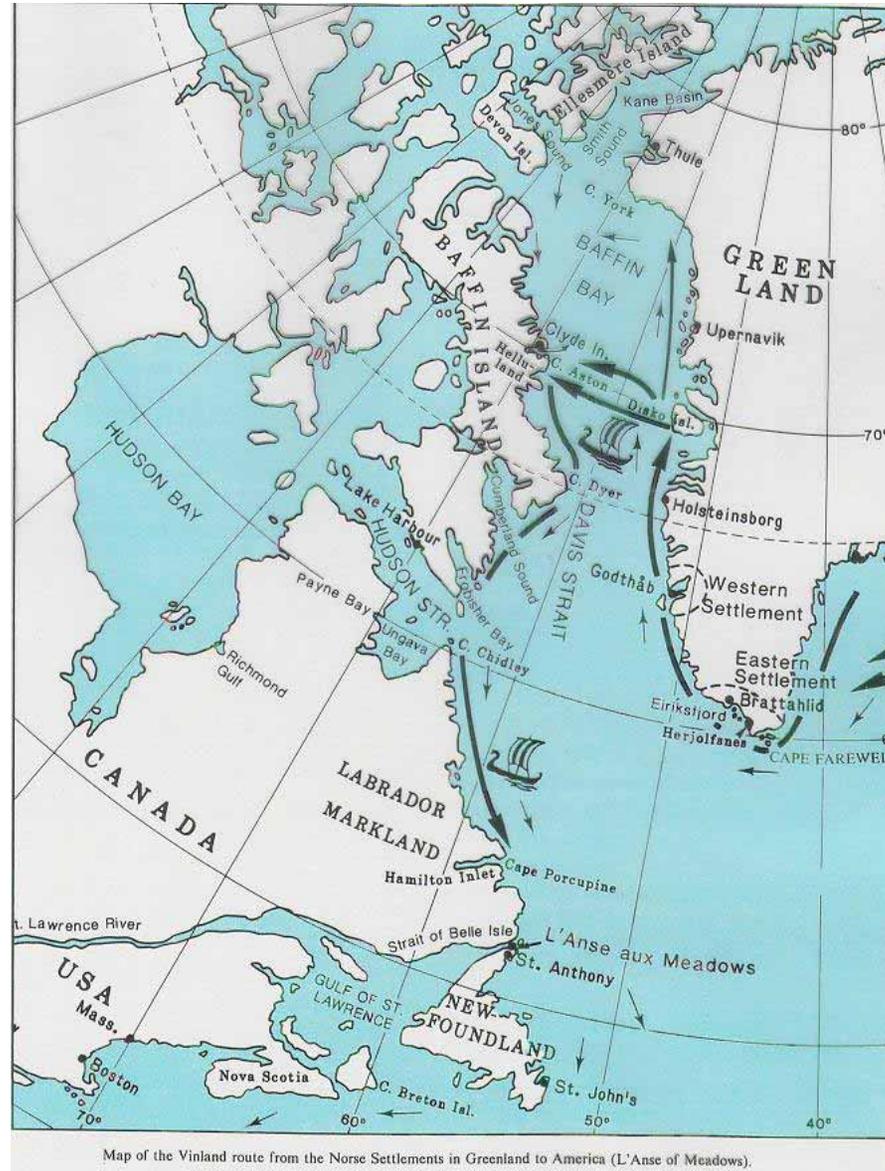


Fig. 5. The ring-headed pin of bronze from house-site A *in situ*. Scale 1:1.

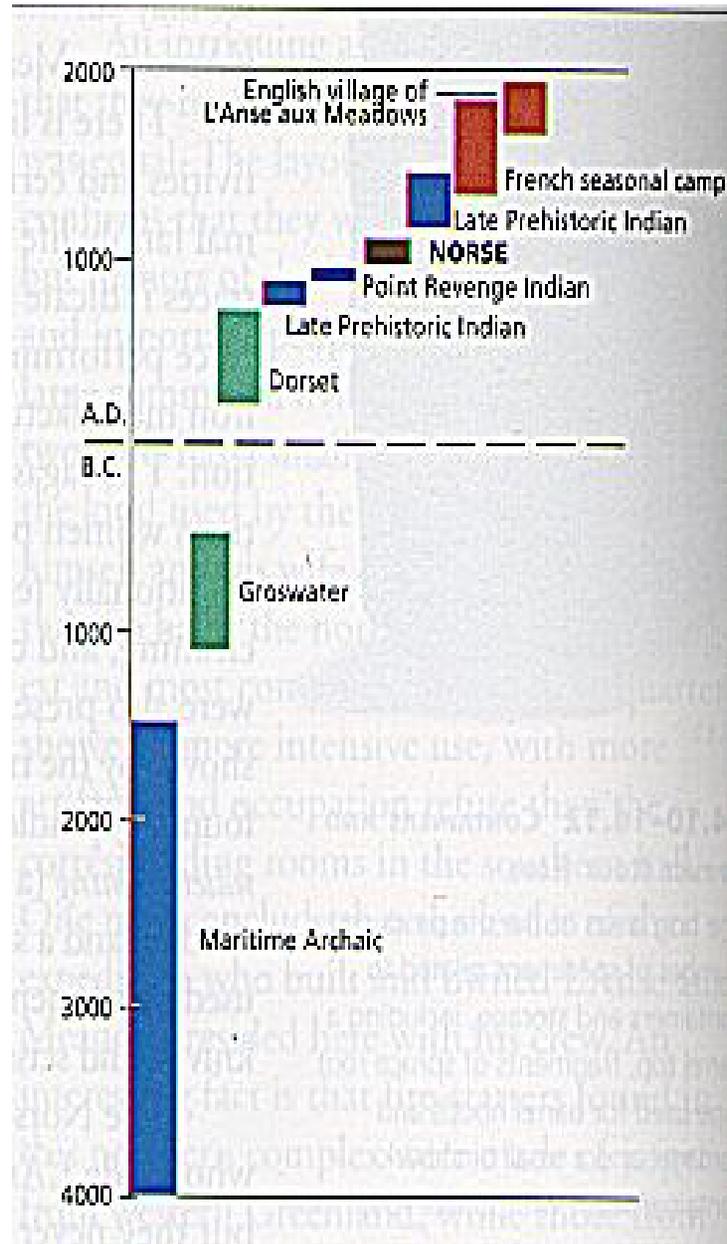
Sample changer carbon ion source at the NSF Facility



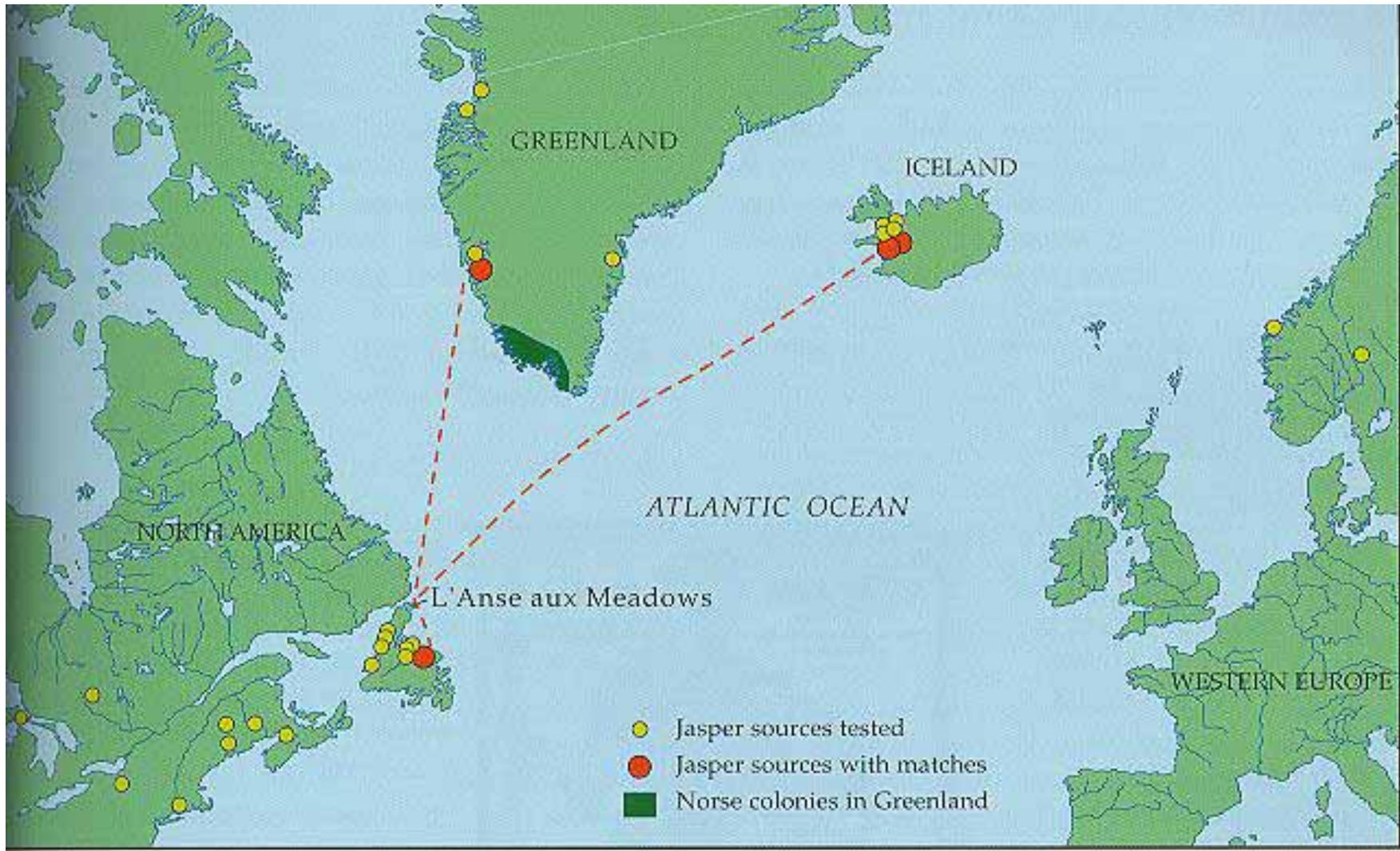
Routes of Viking voyages of discovery



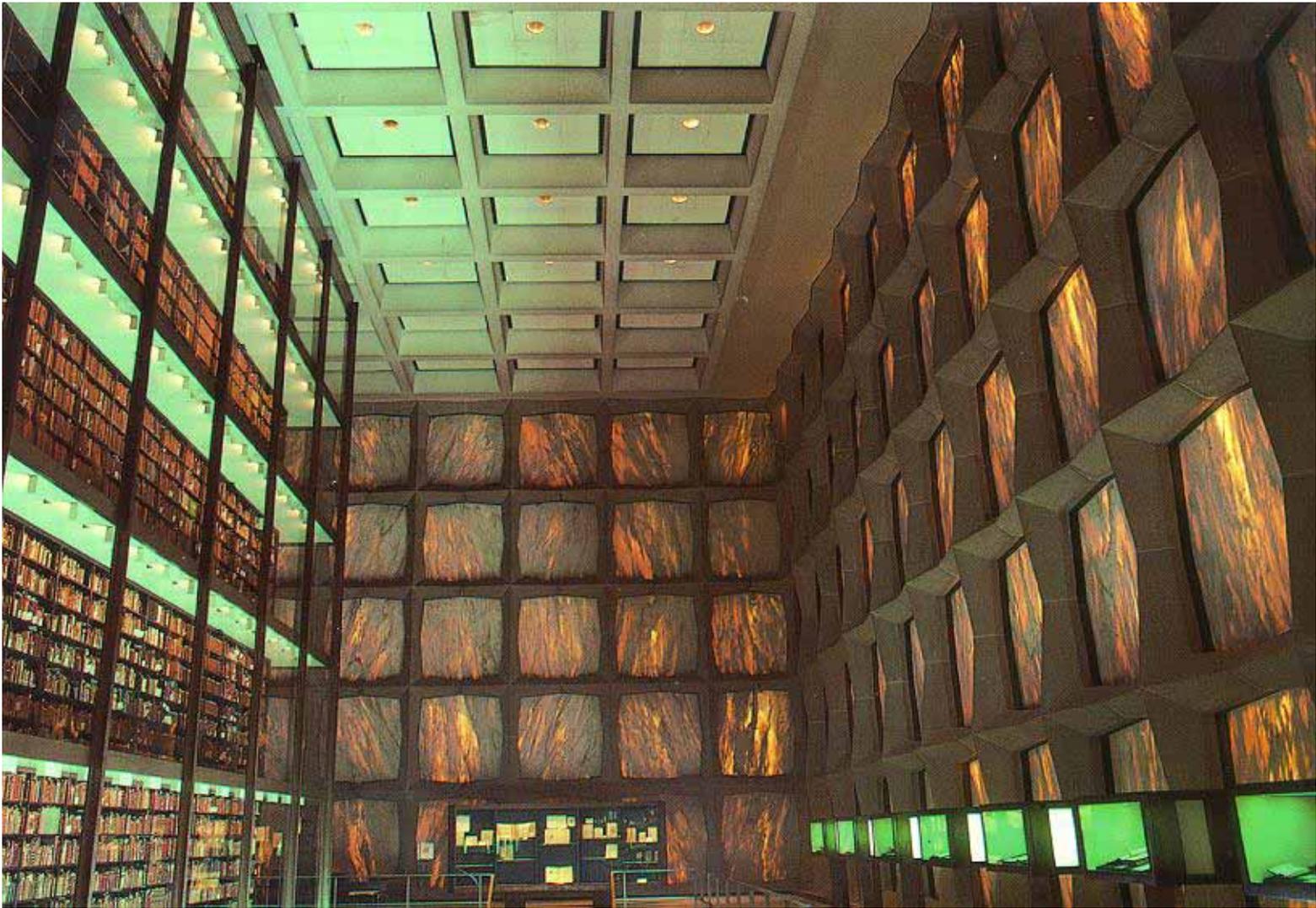
History of the Occupations at the Site of L'Anse aux Meadows



Provenance of Jasper artifacts found at L'Anse aux Meadows



Translucent windows of thin stone slices at the Beinecke Library, Yale University



Map is a Forgery

- Lack of Provenance
- “Accurate” depiction of Greenland as an island
- “Unusual” usages of Latin in inscriptions
- McCrone’s microanalysis of ink on map. Anatase form of TiO_2 only available after 1920’s; therefore map is a forgery.

Response to McCrone

- Cahill et al. PIXE analysis of ink finds titanium 10,000 x lower than McCrone estimate. Ti content is comparable to other 15th century documents.
- Olin. Anatase a natural ingredient in medieval ink if ilmenite is the iron source.

They also find that the leaves of VB, VM and TR are all the same size, exactly 285 x 210 mm. Paleography the same for all three, an "Ubrerrheinische Bastarda" appropriate to the mid 1400's. Witten gives the VM/TR to his wife (??) and Marston presents her with the VB, thus reuniting the three documents originally bound together in mid 1400's.

1959. Marston and Vietor (Curator of Maps in Yale Libraries) decide to buy the VM/TR, and persuade Paul Mellon to purchase the VM/TR/VB from Mrs. Witten for \$1,000,000. They enlist Skelton and Painter to undertake a detailed scholarly study of VM & TR. Mellon funds the publication of the resultant book.

1960. Enzo Ferrajoli is arrested by Spanish Police for theft of documents from Cathedral of La Seo in Saragossa despite evidence that he was offered books (for sale) by the canons of the La Seo. Serves 3 years, paroled in 1963. No evidence whatever that VM/TR came through these sales.

1965. Yale publishes "The Vinland Map and the Tartar Relation" by Skelton, Marston and Painter on Columbus Day (October 12): it is an instant success and enrages the Italian-American community. Several scholars denounce the VM as a blatant forgery.

1966. Washburn (Director Smithsonian American Studies Program) convenes Vinland Map Conference: many scholars, including several Scandinavian, meet to discuss the Map. Questions of authenticity surface. There is a call for scientific analysis of the VM. Proceedings of the Conference are published in 1967. Pastedown offsets are found.

1972. Yale commissions W. McCrone, famous forensic microscopist to examine the VM. He finds quantities of anatase titanium dioxide (a modern pigment) in ink ("up to 40%") and denounces the map as a forgery. Yale announces "Map may be a forgery".

1985. Cahill and Kusko, using PIXE, find little or no titanium on map.

The Reconstructed History of the Vinland
Map (VM), the Tartar Relation(TR), and the
Vincent of Beauvais Speculum Historiale (VB)

based on the Second Edition of The Vinland Map and the
Tartar Relation

Yale University Press, February 1996

and other papers, publications, essays and conversations

Garman Harbottle

Around 1440, Scribe copies VB, VM and TR in connection with the Council of Basle.).

15th Century The three documents are bound into a book. The binder uses a waste notarial scrap in the paste-down of the binding. Waste scrap transfers (“offsets”) its ink to the binding board, in mirror-image. Scrap refers to the Council of Basle. The order in the binding is VM on top, then VB and finally TR on the bottom.

15th to 19th Century, sometime. Bookworms bore through VM into VB, and other worms from back of VB into TR, or *vice versa*.

19th or early 20th Century. Someone removes VM & TR from VB, which is then clumsily rebound with covers reversed, using original binding. VM is “washed”. VM & TR are bound in an inexpensive binding that “looks Spanish”.

Both books in the library of one Don Luis Fortuny ??? or other owner.

Spring of 1957. Rare book dealer Enzo Ferrajoli obtains books, offers them to Davis & Orioli (London, Antiquarian booksellers). Davis secretly shows VM to Skelton and Painter at the British Museum. Painter copies the VM despite promise not to. D. & O. do not associate the VB with VM/TR: it seems that Ferrajoli does not recognize the link either.

September 1957. Witten (Bookseller in New Haven) who often sells to Yale, with Ferrajoli see VM/TR in shop of Rauch in Geneva. Witten buys VM/TR for \$3500. (“The greatest bargain in all the world”). Back at Yale, Witten shows VM/TR to Marston, Curator of Classics in Yale Libraries. Questions arise because the wormholes in VM and TR do not align.

April 1958. Marston buys Vincent of Beauvais from D. & O. for £ 50. Witten borrows VB from Marston, is shocked to realize that the wormholes in the VB and the TR now align perfectly!

THE VINLAND MAP

AND THE

TARTAR RELATION

by R. A. Skelton, Thomas E. Marston, and George D. Painter

for the Yale University Library

with a Foreword by Alexander O. Victor

NEW HAVEN AND LONDON | YALE UNIVERSITY PRESS

Scholarly Arguments

Map is authentic

- Paleography: VB, VM and TR are all the work of one scribe. “Oberrheinische bastarda” mid 1400’s
- Watermarks on paper. VB and TR have bull watermark of “Muhle zu Allen Winden” 1433, near Basle
- Binding appropriate mid 1400’s, Germanic origin
- Offset in pastedown: Council of Basle, 1433
- Wormholes align in VM/VB/TR as originally bound
- Ink analysis: within range of 15th century inks
- What about radiocarbon dating the parchment ???

