To DNA or Not to DNA
by Michelle Patient

Over the years various “new” tools have entered the market and enhanced our research. From microfilm to CD indexes, letters to email correpsondence, and most recently websites with online databases of indexes, transcriptions and digitised original records. Each change has benefited our ease of access to information and gathering of evidence, as well as helping us to more readily find others researching our lines to work with. The latest tool genealogists are using more and more to extracting genealogical evidence from, is DNA testing.

HOW DOES IT WORK?

DNA is in every cell of our bodies. We inherit it from our biologcal parents and they from their’s and so on back through the ages. Hence you contain DNA from many of your ancestors not just your parents. And thus a person’s DNA (be it yours or a relatives) contains evidence to support your research, more than that contained in any single certificate.

You may be surprised to know how far back in generational terms you contain evidence of your ancestors. Ancestry has provided a useful table regarding this which follows:

Generations removed	Likelihood of inherited DNA
1	100%
2	100%
3	100%
4	100%
5	100%
6	99.99%
7	99.5%
8	96%
9	84%
10	64%

Table 1. The likelihood that you inherit any DNA from either one of a pair of ancestors (like your great-grandparents).

Table source: AncestryDNA Help *What is genetic inheritance?*

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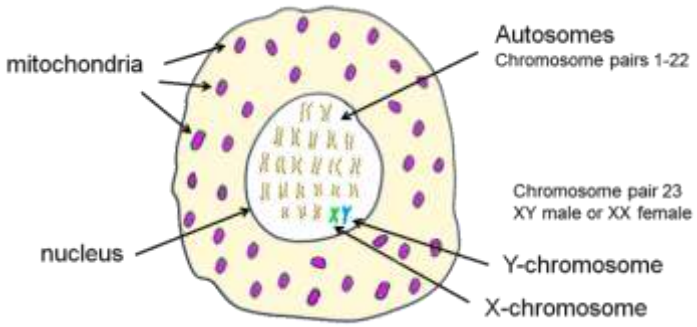
TYPES OF DNA TESTS

Currently there are 3 types of DNA tests which can provide family history evidence.



YDNA
from the Y chromosome and only carried by males
mtDNA
from the mitochonrida we all inherit from our mothers
atDNA
from the 22 pairs of autosomes within the nucleus of every cell

Image used with permission ©Louise Coakley

Knowing how each type of DNA is inherited will help you decide who to test and which test/s to order. For most of our genealogy questions, Autosomal DNA(atDNA) is the best place to start to provide further evidence to help answer those questions.

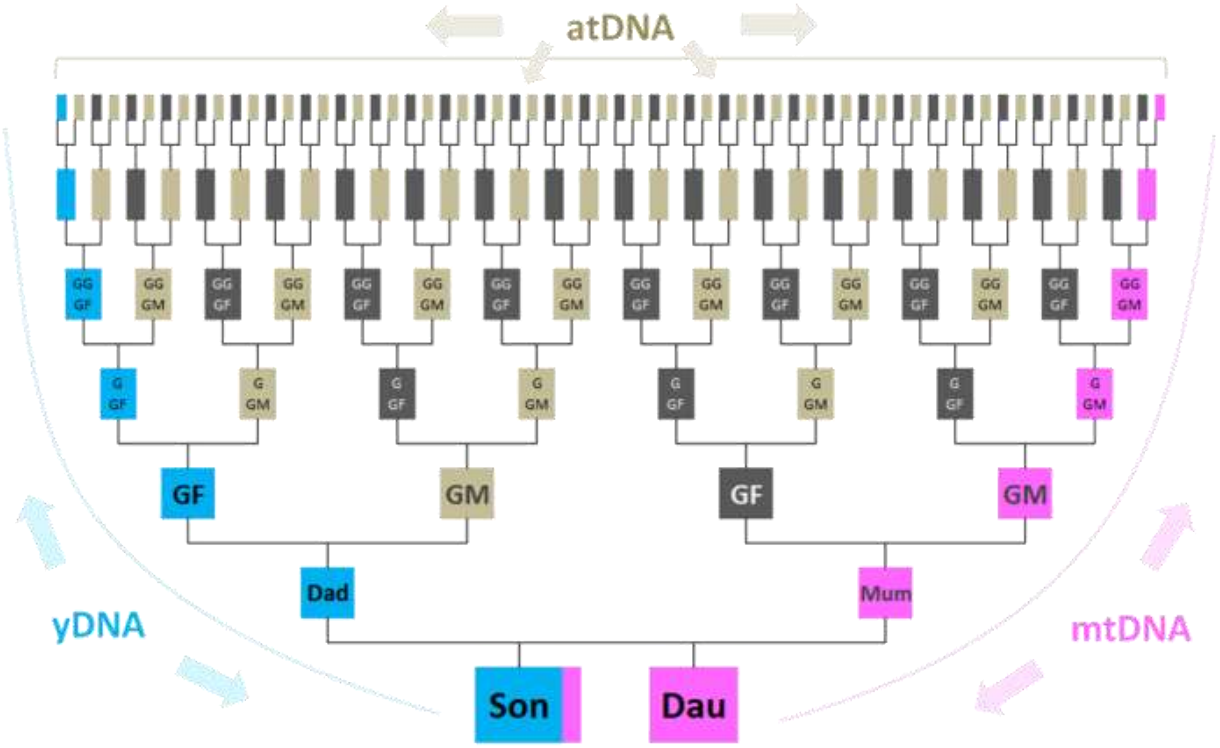


Image used with permission ©Louise Coakley

The atDNA strand is a double helix with four base pairs joining across the twisted strand. Testing identifies which base pair is in select locations on each chromosome and then the “fun” begins. Testing companies provide various services to give you information on how your DNA compares not only with reference data but also with all the others who have their DNA results within that company’s database.

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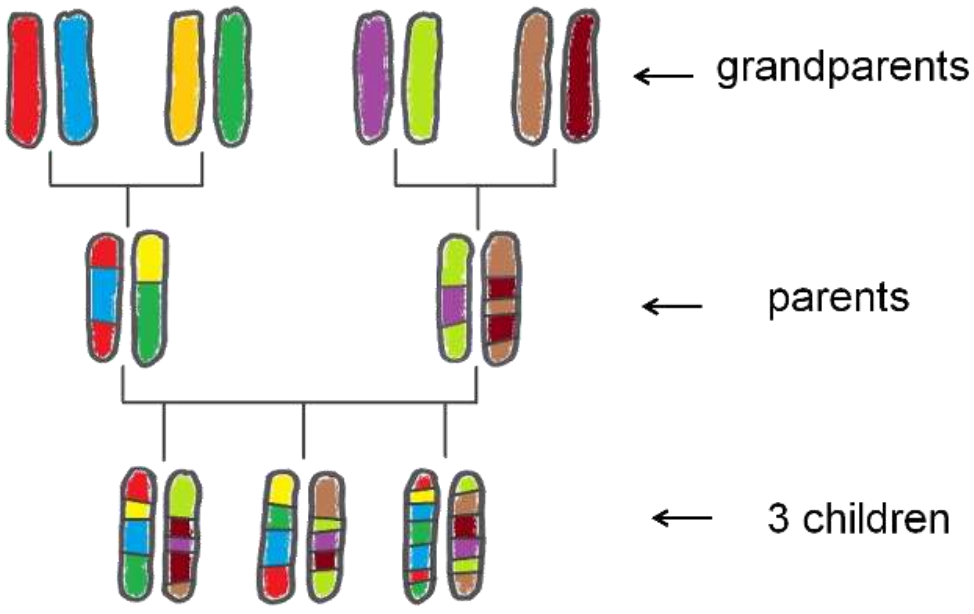
Currently there are five companies that provide a service from which we can extract useful family history evidence. Each company has its pros and cons. All are improving and developing their service as the infrastructure behind the scenes and the scientific understanding of the data becomes more mature.

DNA Results generally give us two types of information. Firstly, about the places our ancestors came from (generally called ethnicity estimates) and secondly matching with the people who are descended from our more recent ancestors (generally called cousin matching).

The most significant benefit from DNA test results is the evidence that can help break through brick walls, confirm assumptions made from circumstantial or indirect evidence and can give a name to those unknowns within our trees. DNA evidence is best when used in conjunction with paper records, but is still valuable even when records have been lost or are not available.

Genetic Trees

Due to the way atDNA is handed down, via process of recombination of chromosomes, genetic trees are not the same as genealogy trees. Siblings don't have identical results unless they are identical twins. Not every ancestor will be represented within your genetic tree.



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Screen shot used with permission ©Ancestry.com

Ref: https://www.ancestry.com.au/academy/course/ancestry-dna-101

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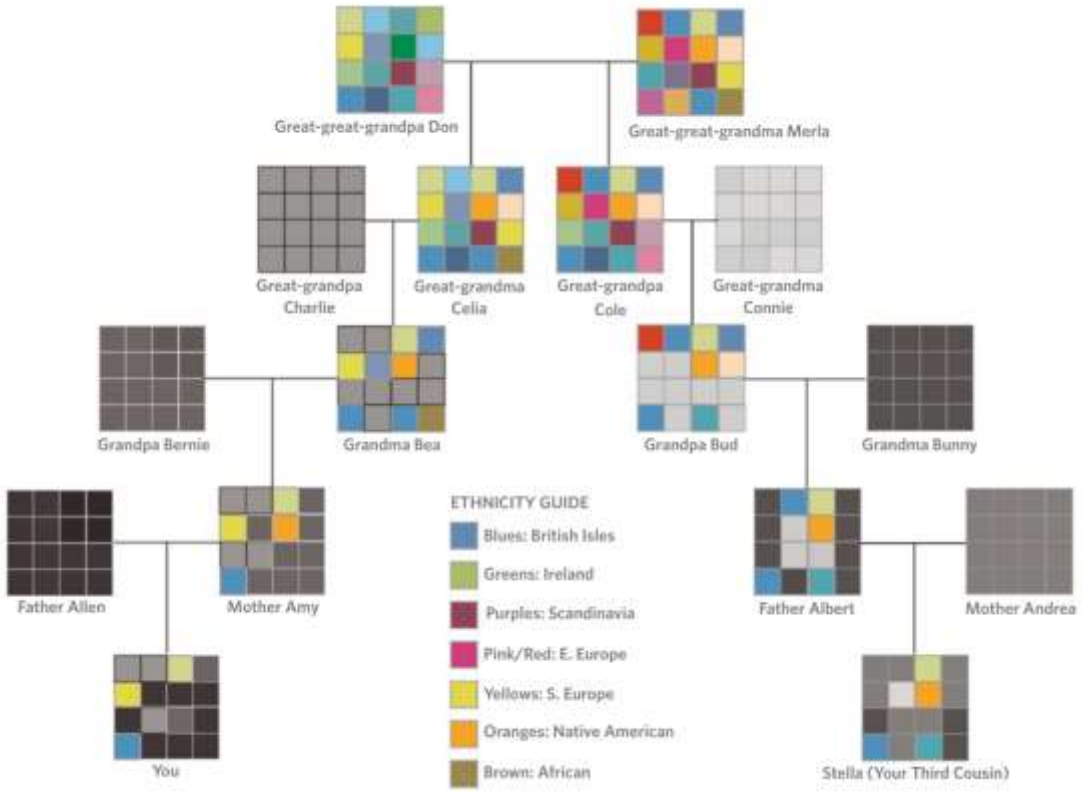
Ethnicity

Ethnicity results are ESTIMATES. It is important to read the online help which each company describes any REGION you are connected to. While the testing is scientifically proven, scientists are developing and deepening their understanding of ethnicity. At the present time, there is insufficient data to narrow down to specific states, counties or country. It is good to remember that these boundaries are political rather than migratory in nature.

Ethnicity Estimates are indicative of the migration routes your more distant ancestors took. Each company's reference different time periods of where your ancestors were from. Some companies reveal places of ancestors were about 2 to 3,000 years ago while others are closer to the edges of our paper based records at around 1,000 to 500 years ago.

Another point to be aware of is that you won't share the same ethnicity as your siblings due to the way DNA is recombined when it is passed down to each generation. It can also vary widely depending on the reference set of each testing company. This graphic from Diahan Southard shows an example of how ethnicity can vary through the generations.



"*Say each of your relatives' autosomal DNA was a big square, made up of smaller colored squares of DNA associated with various ethnic groups. Here, American Indian DNA is orange. Notice that you (there at the bottom left) have no orange in your DNA. Does that mean your great-great-grandmother Merla wasn't American Indian? Of course not. It just means that you didn't happen to inherit that DNA from her in the random shuffling that occurs at each generation. Your third cousin Stella, however, does have American Indian DNA. But this doesn't prove that Merla had American Indian heritage. Instead, it means that somewhere in Stella's pedigree chart, we should be able to find an Indian ancestor—whether it's your shared great-great-grandmother Merla, or someone in the lines of Stella's ancestors Andrea, Bunny or Connie.*" Diahan Southard yourdnaguide.com

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So you won't be surprised when you receive your results, mine varied widely. A total of 69% Great Britain and Ireland with my AncestryDNA test, compared to 0% Great Britain & Ireland at FamilyTreeDNA, 66% Irish (no British) with MyHeritage, 52.1% with 23andMe and 93.4% Great Britain and Ireland with LivingDNA.

Who and where to test

Most genealogy questions will be answered by an Autosomal DNA (atDNA) test – all five companies offer atDNA testing. 23andMe, AncestryDNA, FTDNA, LivingDNA and MyHeritage.

Being compared in the largest pool of atDNA data maximises the potential matches and hence genealogy evidence you can gather.

Testing biological family in the generations above you is generally the best place to start as they carry more of your ancestors' DNA than you do.

Later target testing relatives to further your research on a particular line is something most genealogist will find they incorporate into their research plans. Second cousins are useful relatives to include, as they are guaranteed to share DNA with you.

Relationship	Likelihood of a DNA Match
Siblings	100%
1st cousins	100%
2nd cousins	100%
3rd cousins	98%
4th cousins	71%
5th cousins	32%
6th cousins	11%
7th cousins	3.2%
8th cousins	0.91%

©AncestryDNA Help *The likelihood that you and a distant cousin have matching DNA*

Genetic Genealogist Leah Larkin has compiled data from the major companies to keep us up to date with changes in the industry.

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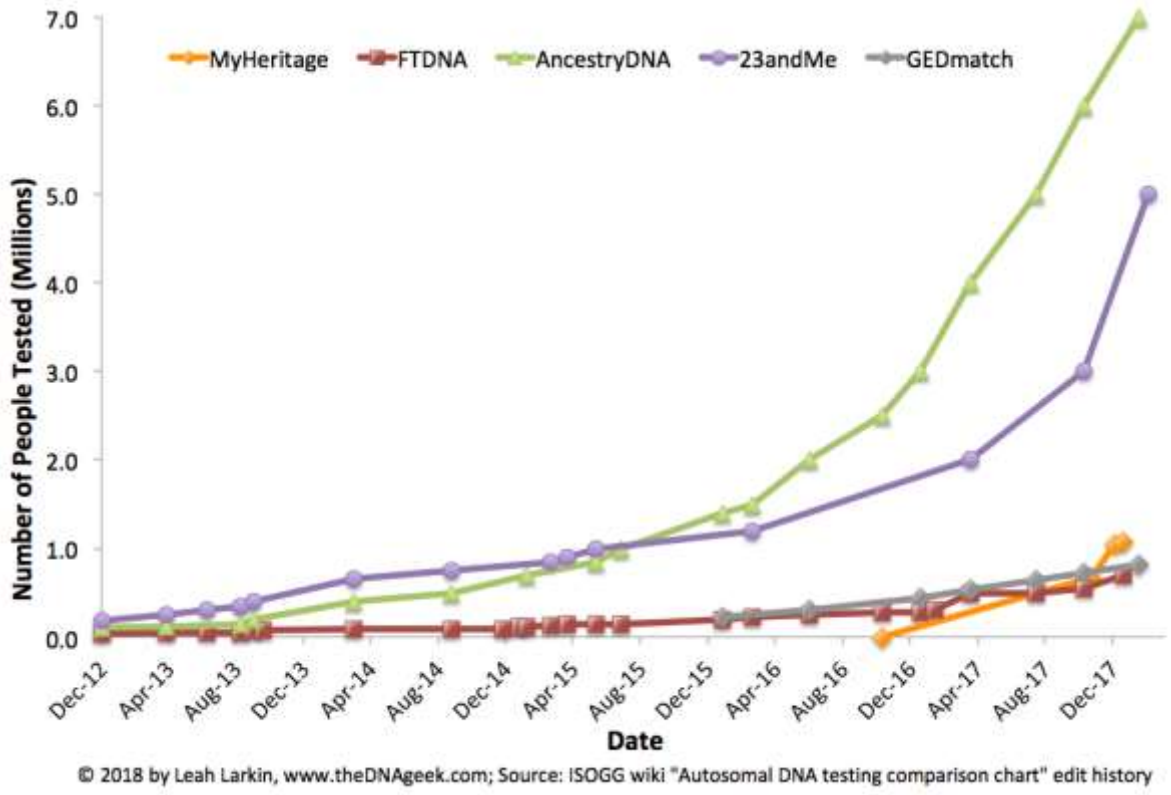

Image courtesy of ©Leah Larkin http://thednageek.com/dna-tests/

Ethical & Privacy Considerations

Just as traditional research methods can reveal previously hidden family secrets, it is also true that DNA testing can reveal unknown, and to some, unwanted information. It is important to be sensitve to others concerns when asking them to take a test to further your research. Unknown aunts, uncles cousins and even siblings may appear, all those who test need to be prepared for the unexpected.

While the major companies are very mindful of privacy considerations for those using their services, it is important to be aware of possible privacy concerns your relatives may have. Particularly when exporting the “raw” DNA test result file (ie: the text file not a personal sample) to supporting tool sites such as GEDmatch, Promethease and DNALand.

Current best testing plan for those starting out:

Initially test at AncestryDNA, then when you are comfortable, consider taking advantage of the free uploads available by transferring raw data (a text file) to:

- Family Tree DNA (FTDNA) join geographic & surname projects
- MyHeritage
- GEDmatch

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Then consider if you need to include Y-DNA testing or add further tests at LivingDNA or 23andMe.

Note: Ancestry and 23andMe do not allow uploads from other testing companies, you have to pay for a test at those sites to be compared to others who test there.

Allow time to learn about this new genealogy record. Unlike other records you have previously used, it has an initially steep learning curve. Read as much as you can in books, blogs and Facebook® groups. Watch the many educational videos available free on YouTube®.

Results are available online and are not automatically posted out to testers via traditional postal services. Internet access is required to receive, view and analyse DNA results.

First Steps when your results arrive:

- Know where to find help on the website
- Read the whole screen – as the website will be new to you
- Watch the Company help videos (some will be on their website others are on the Company's YouTube.com channel)
- Read the Company blogs
- Join the relevant Support Forums – mostly Facebook® groups.

Contacting DNA matches

Most of those testing today have not started any research, many others are adoptees/fostered or foundlings who know little about their biological family. In addition, most will be reading your message on a mobile device, which has a very small screen when compared to a computer monitor. So….

Reach out with a brief note:

- Keep the initial contact BRIEF
- Ask a specific question to encourage a reply eg: *Would you mind telling me the names of your grandparents so we can work out how we are related?*
- Offer some personal info
- Be friendly but not overly long with too much Family History info

If you tested at AncestryDNA use the Green message contact button to ensure email is sent which includes a link to the DNA match. Mention your Facebook® address and your email address. (Orange contact button accessible via the user's profile but will not show the DNA match within the message)

Keep a contact log – such as a spreadsheet, or in Evernote® or One Note®. Make use of the notes or comments options within your tree software as well as within the DNA results site.

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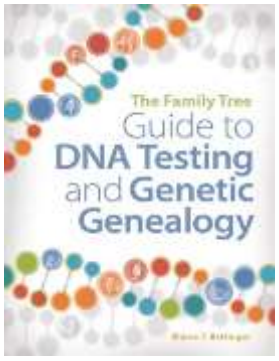
Getting Comfortable?

When you are comfortable using the tools provided by the company you tested with, you might like to export your raw data and upload it to other sites such as FTDNA, MyHeritage, GEDmatch and DNALand. The benefit of doing this is to not only to use the tools at these sites, but to increase the net of cousin matching by being compared to those who have tested at those sites.

To DNA or Not to DNA? That was the question, for most of us the answer will be that DNA testing is the fourth vital record from which to gather genealogy evidence, thus ensuring that we gather **all** the available evidence to analyse in our research process, to verify, or negate, or support our research conclusions and push our research back to more distant ancestors. Hope this helps you to answer this question.

Further Reading

There is a lot to contemplate and learn about DNA and Family History. Having a copy of Blaine Bettinger's book "*The Family Tree Guide to DNA Testing and Genetic Genealogy*" (pub Family Tree Books, April 2016 ISBN 978 1-4403-4532-6) handy for dipping into and re- reading will go a long way to help those pennies of understanding drop more easily as you work with this new genealogy record.



A recent online tool incorporating the latest statistics from the citizen science based, *Shared cM Project* run by Blaine Bettinger and probability data provided by Leah Larkin can be found at Jonny Perl's DNA Painter site. https://dnapainter.com/tools/sharedcmv4

DNA testing abbreviations defined at the International Society of Genetic Genealogists online wiki. https://isogg.org/wiki/Abbreviations

If you need clarity on what is a 1C2R or what other "cousin" relationships mean, this video will help. https://www.youtube.com/watch?v=PM79Epw_cp8

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Key Facebook® groups

New Zealand DNA Users Group
https://www.facebook.com/groups/NZDNAUsersGroup/
Genetic Genealogy Tips and Techniques
https://www.facebook.com/groups/geneticgenealogytipsandtechniques/
International Society of Genetic Genealogists
https://www.facebook.com/groups/400009620157960
DNA Detectives Down Under
https://www.facebook.com/groups/DNADetectivesDownUnder/
GEDmatch User Group
https://www.facebook.com/groups/gedmatchuser/
DNA Painter User Group
https://www.facebook.com/groups/127620554606673/

Key DNA Blogs

http://www.thegeneticgenealogist.com/ by Blaine Bettinger

http://www.genie1.com.au/ by Louise Coakley

http://thednageek.com/ by Leah Larkin

http://legalgenealogist.com/blog by Judy G Russell

http://blog.kittycooper.com/ by Kitty Cooper

http://dna-explained.com/ by Roberta Estes

http://segmentology.org/ by Jim Barrett

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Treasures within the Internet Archive

by Michelle Patient

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https://archive.org/web/

https://archive.org/details/texts

https://archive.org/details/movies

https://archive.org/details/audio

https://archive.org/details/tv

https://archive.org/details/software

https://archive.org/details/image

https://archive.org/details/etree

https://archive.org/search.php?query=mediatype:collection&sort=-downloads

The Internet Archive Frequently Asked Questions (FAQs)

https://archive.org/about/faqs.php#Search_Tips

https://archive.org/about/faqs.php#The_Wayback_Machine

https://archive.org/about/faqs.php#Borrow_from_Lending_Library

https://archive.org/about/faqs.php#Accounts__Information

Some specific Collections & Items

https://archive.org/details/genealogy

https://archive.org/details/gutenberg

https://archive.org/details/newyorkpubliclibrary

https://archive.org/details/boytravellersina00knox

https://archive.org/details/nationallibraryofscotland

https://archive.org/details/The_Sydney_Morning_Herald

https://archive.org/details/microfilm

https://archive.org/details/findmypastpersi

https://archive.org/details/byumapcollections

https://archive.org/details/australia00

https://archive.org/details/normanbleventhalmapcenter

https://archive.org/details/narrative_expedition_botanybay_1005_librivox

https://archive.org/details/commissariotreco16scot

WayBack Machine

https://archive.org/web/

https://blog.archive.org/2017/01/25/see-something-save-something/

https://blog.archive.org/2016/08/09/no-more-404s-resurrect-dead-web-pages-with-our-new-firefox-add-on/

https://web-beta.archive.org/