

Text Analysis with Newspapers, Part 2

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Welcome! In this workshop we'll be exploring several different techniques for analyzing search results from databases of digitized periodicals: distribution over time, page location, collocates, and uniqueness. We'll be focusing on data from [Chronicling America](#) in particular, but these techniques and methods are applicable to any equivalently-structured data from any other database of digitized periodicals.

We'll begin right where we left off at the end of Part 1 of this workshop, with the results of a fuzzy string search. If you attended Part 1 (or completed it on your own), you saved your results as a .csv file; locate that file now and deposit it into R's working directory. If you didn't attend Part 1, I've given you a few .csv files to choose from. Read it in to memory as `hits` by changing the file name in this line of code.

```
hits <- read.csv("spanish_american_war_sn85035720.csv") %>%
  select(-X)
  # R adds an extra numeric identifier column when reading a .csv; this removes it
```

What we have is a data frame of our search hits, in which each row corresponds to a single hit and each column contains a different piece of information about that hit. Most are metadata: the year, month, day, page number, and total pages of the issue in which the hit occurred. The final column is a string of the twenty collocate words immediately preceding and following the hit.

LCCN	Year	Month	Day	Page	Issue_Length
sn85035720	1903	5	14	seq-2	6
sn85035720	1903	6	13	seq-1	6
sn85035720	1903	7	29	seq-1	6

x

was in waiting to watch the president turn his shovelful of earth for the mckinley monument many representatives of the spanish american war veterans the grand army and the pioneers were in attendance and they were referred to in eulogistic

printed in the news over two months ago the lottie moore gave the local customs officers considerable concern during the spanish american war when she laid at south amboy with coal bound for southern ports she was never heard from after leaving

mr sweet will go to the catskill mountains to recuperate he has not been in very good health since the spanish american war in which he took part as a member of the 71st regiment of new york during the war he

It's important to emphasize that each hit represents a single use of the search name or phrase, *not* a single

article in which that name or phrase occurred (which is how search results are usually organized in databases and online generally). If a name is only used once in an article, as is often the case, this doesn't make any difference. Longer, more focused articles have the potential to generate multiple separate hits.¹ But this is actually better for most purposes: data organized by the total number of occurrences rather than the number of articles better reflects the amount of space devoted to the particular person, event, or topic in question.²

It should be added that the collocates here are not necessarily from the article in which a search name or phrase occurred: if the desired pattern of characters appeared at the beginning of an article, for example, the first half of the collocates string would actually be from the end of a (potentially totally) different article. (This isn't necessarily a bad thing either: after all, this is how it appeared in print). The more results we have, however, the more we can count on irregularities being filtered out.

Quantifying Hits Over Time

One of the most useful and straightforward forms of quantitative analysis when it comes to working with data from periodicals is distribution of reference over time. First, let's simply make a bar graph of the raw number of references by month. Be sure to change the title of your graph by editing the text in the `ggtitle` function!

```
plot <- hits %>%
  group_by(Year, Month) %>%
  summarize(Total=n())
  # group the data by year and month and summarize the number of hits as `Total`

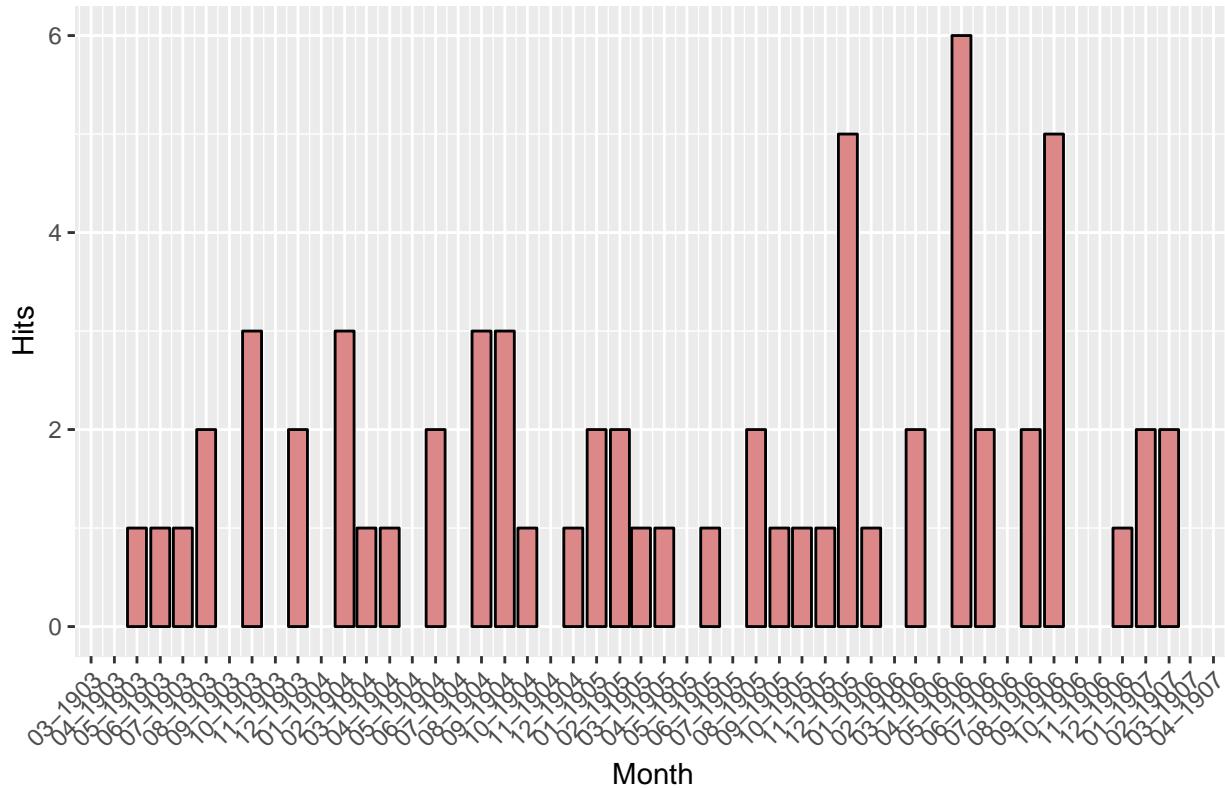
plot$Date <- as.Date(paste(plot$Year, plot$Month, "01", sep="-"), format="%Y-%m-%d")
# R has a special date format that makes generating visualizations much easier

# the next block of code generates a graph, but most lines are purely aesthetic. the first
# four lines do the bulk of the work: selecting the data to be used in the x and y axes
# (lines 1-2), specifying a bar graph (line 3), and scaling the x axis by months (line 4).
plot %>%
  ggplot(aes(x=Date, y=Total)) +
  geom_bar(colour="black", fill="#DD8888", stat="identity") +
  scale_x_date(date_breaks = "month", date_labels=( "%m-%Y")) +
  theme(legend.position="bottom") +
  labs(x="Month", y="Hits") +
  ggtitle("References to the Spanish-American War") +
  theme(plot.title = element_text(face="bold", size=rel(1.5))) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```

¹If a person, in particular, is only referred to by their surname after the first reference to them, these subsequent uses won't be recognized as hits.

²That said, converting the overall number of references into the number of articles containing a reference wouldn't be hard: one would simply collapse all hits on the same page of the same issue into a single entry.

References to the Spanish–American War



Simply knowing the raw number of references doesn't actually reveal a whole lot, however. What's missing from this analysis is some measure of the significance of each hit. This is especially important when comparing usage in multiple newspapers.

One way to measure significance of reference is frequency. Word frequency - the number of references within a given time span divided by the total number of words over the same period - is one common approach. But as we've already discovered, newspaper OCR data tends to churn out a lot of word fragments. The total number of words is thereby significantly inflated, meaning that any word-based frequency analysis would significantly misrepresent the actual frequency of reference. Measuring frequency by dividing by the total number of pages within a particular period is a more stable approach.

There is a substantial difference in the number of pages the *Perth Amboy Evening News* printed per issue even between 1903 and 1907, the first and last year of our data - yet another reason why the raw number of references is limited. This means that while we have the number of pages in each issue for which there was a search hit, we'll need to go back to our filepaths in order to pick up the exact number of pages printed per month. You'll recognize this code as a slight adaptation of what we used in the previous workshop to generate an input matrix.

```
years <- list.files("/Users/ahl80/Downloads/sn85035720")
for (k in seq_along(years)) {
  months <- list.files(paste("/Users/ahl80/Downloads/sn85035720/", years[k], sep=""))
  for (j in seq_along(months)) {
    date <- as.Date(paste(years[k], months[j], "01", sep="-"), format="%Y-%m-%d")
    # this line and the next are the only two that have really changed; we only need the
    # year and month in date format, so we paste them together instead

  pages <- length(list.files(Sys.glob(paste("/Users/ahl80/Downloads/sn85035720/",
                                             years[k], "/", months[j], "/*/*", sep=""))))
```

```

# the length of the list of all files contained within the particular month directory

one_month <- data.frame(Date = date, Pages = pages)
if (exists("by_month")) {
  by_month <- rbind(by_month, one_month)
} else {
  by_month <- one_month
}
}
}

```

Before generating another visualization, we'll combine the metadata we just obtained with the simplified hits data used for the previous visualization. You'll want to edit the text in `ggtitle` again as well.

```

freq <- merge(by_month, plot, by="Date", all=TRUE)
# merge the data frame containing the total number of pages with the data frame of simplified hits data by the Date column, which they share

freq$Total[is.na(freq$Total)] <- 0
# it's necessary to replace null values with 0s when graphing

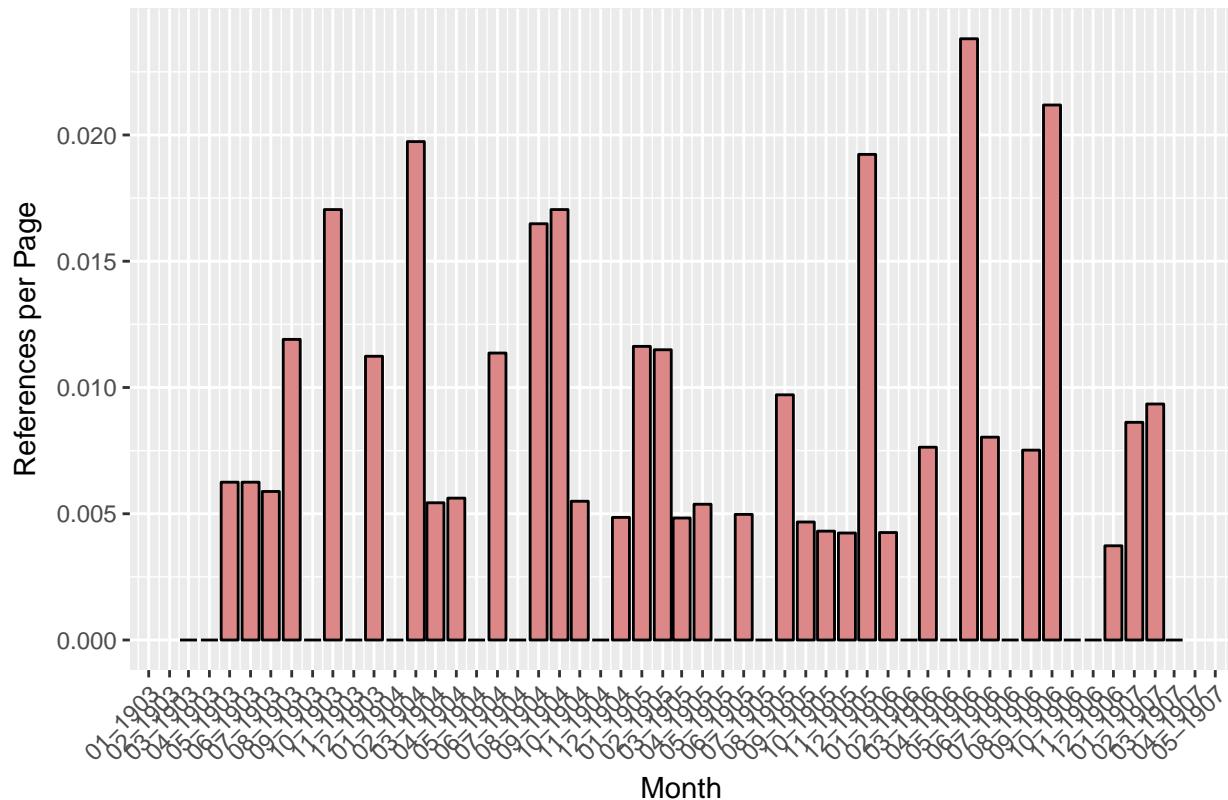
freq <- freq %>%
  select(Date, Total, Pages)
# getting rid of the columns we don't need

freq %>%
  ggplot(aes(x=Date, y=(Total/Pages))) +
  # the division here is the only real difference between this visualization and the last

  geom_bar(colour="black", fill="#DD8888", stat="identity") +
  scale_x_date(date_breaks = "month", date_labels=("%m-%Y")) +
  theme(legend.position="bottom") +
  labs(x="Month", y="References per Page") +
  ggtitle("Frequency of Reference to the Spanish-American War") +
  theme(plot.title = element_text(face="bold", size=rel(1))) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))

```

Frequency of Reference to the Spanish–American War



This bar graph looks quite similar to the previous at first glance, but there are of course several important differences. What was previously 11 references to the Spanish-American War is now .06 references per page - in other words, the *Perth Amboy Evening News* in March 1904 referenced the Spanish-American War at a rate of about 6% of its pages.³

Comparing these two bar graphs reveals another subtle though important difference. (You can do this in RStudio with the back button in the plots viewer.) Though there's something of a spike in the raw number of references to the Spanish-American War in late-1905 and 1906, these months aren't that unusual if we're measuring by frequency: there may be fewer references for 1903 than 1906, but there are also considerably fewer pages in the *Perth Amboy Evening News* in 1903, meaning that those references carry slightly more weight. This would be even more important if we had data back to 1898, when the war was happening but the *Evening News* was probably printing still fewer pages.

In order to compare references across multiple newspapers, we would need to think in some form of frequency in order to make up for differences in issue lengths or numbers. With data from multiple newspapers, we could analyze differences in the amount of attention each gives to a particular person, event or topic. With many newspapers, we could even begin to suggest conclusions about demographics (political, racial, economic, geographic). Rather than moving outward, though, we're going to zoom in and do a bit more finer-grained analysis.

³The clunky language here is necessary for precision: remember that our original search returned one result for each approximate match, *not* one result for each page on which there was a match. For this reason, 6% is the rate of reference per page; it is not necessarily the case that 6% of pages contain a reference.

Page Data

Not all references are created equal. Newspapers perform many different cultures functions, and as such they reference the same persons, events, or topics in several different contexts. Fortunately, the internal structure of newspapers generally reflects these contextual differences. In the period we're working with, this structure was organized by page. In order to make sense of page data, we would want to look at some issues of [the Perth Amboy Evening News itself](#) in a bit more detail. But for sake of time, I'll summarize.

In the late nineteenth and early twentieth centuries, most newspapers were issued either weekly or daily. Daily papers, like the *Perth Amboy Evening News*, had a larger weekend edition (usually on Friday or Saturday) and usually didn't print one day of each week (often Sunday). By the turn of the century, weekly papers and the weekday editions of daily papers were moving towards eight-page issues; weekend editions fluctuated a bit more, between ten- and sixteen-page issues (the difference was largely contingent upon advertising). The format of all these newspapers, however, is actually quite similar, and we can draw several general rules.

The front page generally contains the biggest news stories, and the back page is generally advertisements. The second page often contains state news and comparatively big local news. Page three contains entertainment - fiction, sports, or society news - though in weekend editions one or two of these categories are bumped, often to page seven, eight, or nine. The masthead (as opposed to the nameplate on the front page) usually appears on the left side of page four, regardless of how many pages are in the issue, followed by editorials. The pages following the masthead often contain classifieds and local news listed by town (one page in a six-page issue, separate pages in issues eight pages or more). This gets us up to eight pages. The additional, final pages in weekend editions generally contain a bit more international news and literary content or cultural news, but they are primarily filled with advertisements: it's not uncommon to see a single column surrounded by ads on pages nine and on.⁴

First, how many hits definitely appear in weekend as opposed to weekday editions? In other words, what is the `length` of the vector of hits which come from issues with more than eight pages?

```
length(which(hits$Issue_Length > 8))
```

```
## [1] 8
```

Just to jog our memories, that's out of a total of:

```
length(hits$Page)
```

```
## [1] 24
```

One third of the references to Jack London were printed in the weekend edition. Note that weekend editions of the *Perth Amboy Evening News* made up only about one fifth of the total pages printed in a week. There are a couple different avenues of analysis one might pursue here. On the one hand, a large proportion of total references in the weekend edition might suggest that the referent is less locally relevant. On the other hand, the weekend editions of newspapers were more widely read; one might consider weighting references from weekend editions when measuring usage over time in order to reflect this fact.

But let's keep moving forward; next, how many hits appear on each page?

```
hits$Page <- as.numeric(sub("seq-", "", hits$Page))
# to make the data easier to work with, we remove the "seq-" before the page number and
# convert the page number from a character to a numeric value
```

```
sort(table(hits$Page), decreasing=TRUE)
```

```
##
##   6   5   7   4   2 15   1   3   8   9
##   5   4   4   3   2   2   1   1   1   1
```

⁴These conventions were not as universal as those used in the four-page newspaper format before the Civil War, but they were nonetheless quite consistent. See Barnhurst, Kevin G. and Nerone, John. *The Form of News*. New York: Guilford Press, 2001.

Let's look more closely at the collocate strings for the hits on just one page, say, page seven.

```
str_split(hits$Collocates[which(hits$Page==7)], " ")  
  
## [[1]]  
## [1] "form"      "of"        "an"        "nutobio"    "traphy"  
## [6] "by"         "s"         "weir"      "mitohell"   "the"  
## [11] "listorical" "accuracy"  "of"        "which"     "nas"  
## [16] "not"        "ret"       "been"      "assailed"   "and"  
## [21] "jaok"       "london"    "s"         "absorbing" "tale"  
## [26] "tito"       "sea"       "wolf"      "there"     "is"  
## [31] "a"          "variety"   "of"        "diverting" "aud"  
## [36] "humorous"   "short"    "btories"   "of"        "separate"  
## [41] "interest"   "a"        "second"  
##  
## [[2]]  
## [1] "depots"    "dock"     "yards"     "torpedo"   "boats"  
## [6] "etc"        "etc"      "probably"  "the"      "most"  
## [11] "conspicuous" "american" "contributor" "to"      "the"  
## [16] "metro"      "politan"   "lor"       "april"    "is"  
## [21] "lack"       "london"    "the"      "now"      "famous"  
## [26] "author"    "of"        "the"      "call"     "of"  
## [31] "the"        "wild"     "be"        "contributes" "to"  
## [36] "tiiis"      "1"        "isue"     "the"      "first"  
## [41] "part"       "of"        "a"  
##  
## [[3]]  
## [1] "maegrath"  "st"        "elmo"     "augusta"   "evans"  
## [6] "ia"         "am"        "webster"  "handy"    "dictionary"  
## [11] "15"        "ieneil"    "boxes"    "line"     "imported"  
## [16] "boxes"     "worth"     "the"      "sea"      "wolf"  
## [21] "jack"       "london"    "eben"     "ho"       "wen"  
## [26] "irving"    "bacheller" "the"     "j"        "vebster"  
## [31] "s"          "lrmnary"   "dictionary" "43c"     "25c"  
## [36] "up"         "to"        "1"        "50"      "j"  
## [41] "priced"    "75c"      "to"  
##  
## [[4]]  
## [1] "and"       "we"        "can"      "not"  
## [5] "j"          "my"        "or"       "borrow"  
## [9] "enough"     "hooks"    "to"       "go"  
## [13] "round"     "wo"        "cry"      "avaunt"  
## [17] "adventure" "et"        "we"       "crave"  
## [21] "jack"      "london"    "wr"       "yawn"  
## [25] "1"          "begone"   "introspection" "yet"  
## [29] "we"         "call"     "or"       "henry"  
## [33] "lames"     "away"     "with"     "the"  
## [37] "iroblem"   "novel"    "we"       "shout"  
## [41] "and"       "yet"      "ast"
```

The contexts of these references *should* fit what we would broadly expect for page seven. The references to Jack London do at least; we can tell that three of the four are from descriptions of the contents of the month's major magazines, which is precisely the kind of material printed on page seven. But if we wanted to be sure, since we have the dates for each hit, we could go back and do a bit of spot-checking on Chronicling America to confirm (Figure 1).

PERTH AMBOY EVENING NEWS.

PAGES 7 to 10

PERTH AMBOY EVENING NEWS, FRIDAY, JULY 29, 1904.

Clear Them Out!

Profitless prices now hold full sway. Prices that will clear our store of present summer goods as a storm sweeps the deck of an ocean steamer. The Clearance is ABSOLUTE. The goods must go. It's a stupendous undertaking—a daring movement—a sale with values unparalleled in the history of Perth Amboy merchandising.

3 1/2c per yard, the balance paid out for 12 yards.	7 1/2c per yard, the balance of our 12 1/2 and 15c Lawn.
4 1/2c per yard, 100 Yards, sold everywhere at 8c.	4 1/2c per yard, best Apron Gingham.
1,000 yards Casings, sold everywhere at 8c.	1,000 yards Casings, sold everywhere at 8c.
1,000 yards choice of a few White Lawn Skirts.	Our price to morning make. Our price to morning for the 25c quality.
1,000 yards choice of a few White Lawn Waists.	10c per pair. Ladies' Im- perial, 10c per pair. Children's Waists, 9c per pair. Children's Waists, 9c per pair. Girls' 10c per pair. Girls' 10c per pair.
1,000 yards choice of a few 3.00 White Lawn Waists.	12c per pair, full regular Hose, 10c per pair. Black lace Stockings, regular price 4c.
1,000 yards choice of a few 3.00 White Lawn Waists.	12c per pair, full regular Hose, 10c per pair. Black lace Stockings, regular price 4c.
38c per pair, Ladies' Im- perial, 10c per pair.	38c per pair, Ladies' Im- perial, 10c per pair.
50c per pair, 5 doz. Ladies' \$1 H. & H. and W.B. Corsets	50c per pair, 5 doz. Ladies' \$1 H. & H. and W.B. Corsets

We have a few Infants' and Children's White Dresses that have gotten soiled and matted up during the sale. These must go at once, as prices have been slaughtered.



10 STAMPS FREE

On Saturday July 30th we will give 10 Stamps free to every person making a purchase of 25c and by bringing this coupon.

GREAT SALE IN BEEF

Prime Chuck Roast special, lb.	10c	On presentation of this coupon to our store on Saturday, you will receive 10 Blue Stamps free with a 25c purchase.
Fancy Prime Rib Roast, lb.	12, 14	P. PAVLOVSKY, PROP. 365 STATE STREET, COR. CENTER.
Special Reductions in Veal, Pork, Mutton and Lamb		Near P. R. Station. Telephone No. 106 W.
Very best Po Roast, lb.	10c	

Breast of Lamb 5 lbs for	25c	5 pounds PLATE BEEF 5 pounds CORNED BEEF 2 pounds CHOP MEAT
LEGS OF MUTTON	13c	
SHOULDER OF LAMB	8c	
LEGS OF SPRING LAMB, lb	14c	

25c

P. PAVLOVSKY, PROP.
365 STATE STREET, COR. CENTER.
Near P. R. Station. Telephone No. 106 W.

Mechanics' Tools, Mill Supplies.

FOR YOUR INFORMATION
We have put up a number of BATH TUBS just to illustrate how the tubs can be made to fit your house, being compact, convenient—nothing more than a few inches wide. If you call and see them you'll know just how to have yours made.

Radiators, Radiators, Valves, Pipes, Fittings, Asbestos Coverings, High Grade Plumbing Goods.

21 & 23 MARKET ST., NEWARK, N.J.

REED & CONOVER MECHANIC ST. NEWARK, N.J.

ED. PINAUD'S EAU DE QUININE

cleanses the way and keeps it clear from dandruff—it penetrates to the roots giving a strong hold—keeps hair from falling out and helps to hold the hair in a tight grip. It imparts a wonderful softness and gloss to the skin—keeps the skin soft and smooth.

4 oz. bottle, 50c. 8 oz. bottle, \$1.00.

Ed. Pinaud's American Import Office, 22, Front Building, Newark, N.J.

EVENING NEWS the Best Advertising Medium.

ATTRACtIONS IN THE AUGUST MAGAZINES.

CENTURY.

The August Century is in nest as well as in name a Mishmash Holliday Number, being pervaded with the humor and wit of the editors of the house, and the stories are of the same type as the magazine itself, large figures on each pair. Don't get these mixed with the cheap, off brand quality Black Cat Stockings, all sizes, same as those you buy elsewhere at 1, 50 to 1, 60c.

Black Cat Stockings.
The 3c Black Cat Stockings we are advertising and selling at a lower price than others sell because the numbers of the Century are larger figures on each pair. Don't get these mixed with the cheap, off brand quality Black Cat Stockings, all sizes, same as those you buy elsewhere at 1, 50 to 1, 60c.

Pa. pair 15c.

1, 50c per pair, Ladies' White Lawn Skirt Waists (not the \$4 kind that are sold elsewhere) regularly at 1, 50 to 1, 60c.

1, 50c per pair, Ladies' 100% Cotton, full regular maid service, black lace Stockings, the price to morrow for the 25c quality.

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Compare that, for example, with the manner in which Jack London is typically referenced on page two or on page six (Figures 2 and 3).

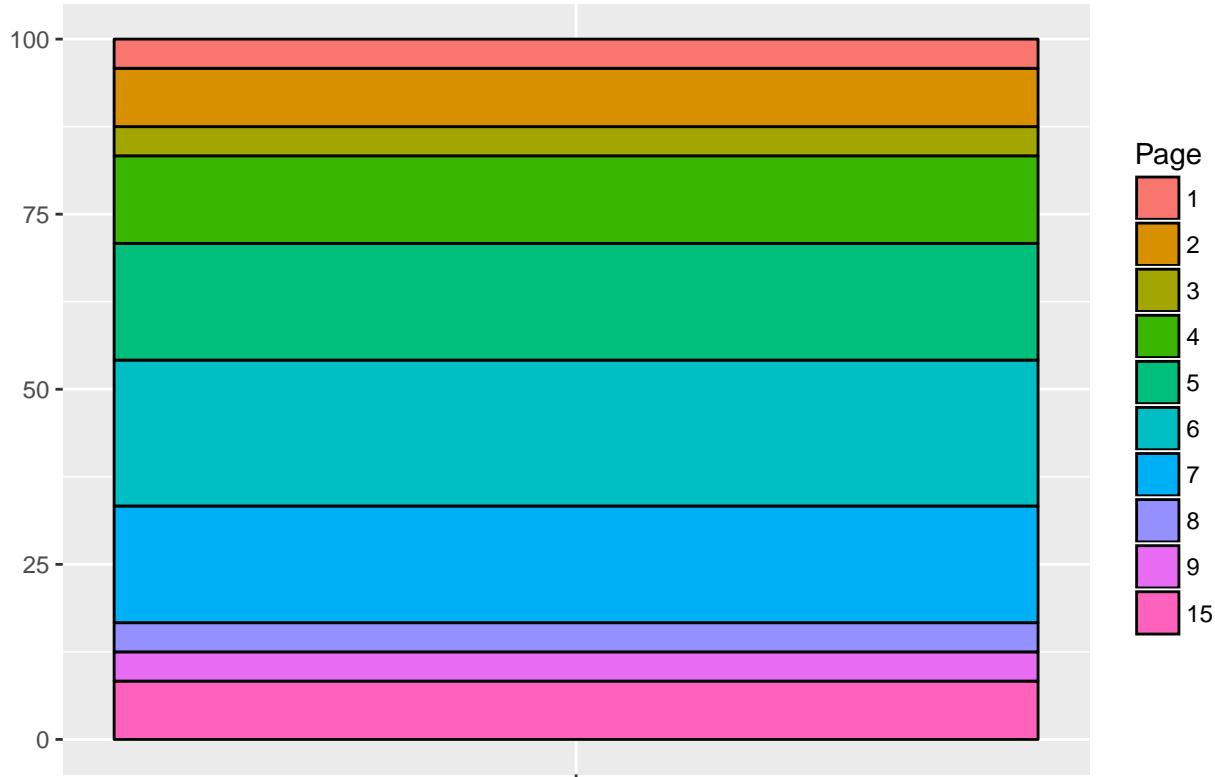
We can generate a visualization to graph what percentage of references to the search phrase appears on each page to further explore page distribution.

```
graph <- hits %>%
  group_by(Page) %>% summarize(Total=n()) %>%
  mutate(Page_Percents = Total/sum(Total)*100)
# group the data by page and make a new column `Total` summarizing the total references
# per page, then make a new column of the % of references per page

graph <- graph %>%
  arrange(Page) %>%
  mutate(Page = as.character(Page))

graph %>%
  ggplot(aes(x="", y=Page_Percents, fill=factor(graph$Page, levels = 1:16))) +
  geom_bar(stat="identity", color="black") +
  theme(axis.title.y=element_blank(), axis.text.x=element_blank()) +
  ggtitle("Percent of References to Jack London per Page") +
  theme(plot.title = element_text(face="bold", size=rel(1.5))) +
  theme(axis.title.x=element_blank()) +
  scale_fill_discrete(name="Page")
```

Percent of References to Jack London per Page



With a bit of extra fiddling, we can generate a visualization to compare the distribution of references by page for multiple search phrases.

BOTH MEN ON TRIAL TODAY.

WILL HAVE NEW TRIAL.

Hennessey and Hathaway Both Made Complaints Against Each Other.

SHOT IN A SALOON.

Special to Evening News.

New Brunswick, Feb. 2.—The trial of Charles J. Hathaway, the man whom Hathaway is charged with stabbing, was again adjourned on Friday morning, and will be held on March 3, according to the statement made by the prosecutor this morning. New witnesses will be called at the trial.

Hathaway is charged with stabbing Hennessey in an affair in Fritz Sperr's saloon in Perth Amboy, on February 18. Both men were called in to the trial. Hathaway, it is claimed, was stabbed by Hennessey in a fit of rage. Fritz Sperr's saloon is in Perth Amboy, on the street of the same name. He is the son of John C. Hennessey, of the Lehigh Valley steel company. J. E. Stricker, of Perth Amboy, represents Hathaway. Mr. Peter F. Daly, of this city, is counsel for Hennessey.

The first witness called was Dr. G. W. Flinn, of Perth Amboy. He stated that Hennessey was in a saloon with Fritz Sperr when he told his version of the affair. J. K. Keane, of Perth Amboy, was also called in to the trial. H. Parhamore, William J. McNamee, of Perth Amboy, who arrested Hathaway, was also present. Both the parties, who are also complainants, were sworn and told their respective stories. The case was still on when the noon recess was taken.

MISSIONARY SOCIETY HAS NEW OFFICERS.

Presbyterian Ladies Meet at Home of Mrs. Wilber Latson and Transact Business.

The Home Missionary Society, of the Presbyterian church, met at the home of Mrs. Wilber Latson, Market Street, yesterday afternoon, and elected the following officers: President, Mrs. Adeline Drown; vice-president, Mrs. A. C. Monte; second vice-president, Mrs. Wilber Latson; secretary, Mrs. C. K. Stevens; treasurer, Mrs. William Graham.

MRS. NIELSEN'S FUNERAL.

Two Services Attended in a Body—Interment in Alpine.

The funeral of Mrs. Carl Nielsen was held from her home residence, 10 Hall Avenue, at 1:30 o'clock this afternoon, followed by a service at St. Stephen's Danish Lutheran church at 3 o'clock. The Rev. P. S. Hansen, pastor of the church, officiated. The funeral was made in Alpine cemetery. The funeral services were largely attended. The services were conducted by Stephen Scholz, August Moesgaard, Niels Petersen, Niels J. Nielsen and his brothers, Niels J. Nielsen, Sonny, to which Mr. Nielsen belongs. The funeral was attended by large delegations from the Danish Relief Society and the Alpine Lodge No. 45, Improved Order of Red Men.

Royal Yacht Club Meets.

The meeting of the Royal Yacht Club, which was a meeting of the Board of Governors, was held last night. There is now a desire to be transacted and it is the desire that as many members as possible be present.

Real Estate Advert's me in the Evening News brings results.



A HANDSOME WATCH
of the latest style. You or your man or wife will not necessarily be a big drain on your pocketbook if you make your purchase at our store and we have not seen our display of JEWELRY.

We provide a ready-made suit for one store even if you don't intend to buy. We extend to you a cordial invitation.

L. PERELMAN
390 Main Street, Perth Amboy

EX-SECRETARY DEAD!

W. C. Whitney Succumbed to Operation For Appendicitis.

WAS IN CABINET UNDER CLEVELAND

Special to the Evening News.
New Brunswick, Feb. 3.—The Rabowitz case will be tried again either on Monday or Tuesday next, according to the statement made by the prosecutor this morning. New witnesses will be called at the trial.

Hathaway is charged with stabbing Hennessey in an affair in Fritz Sperr's saloon in Perth Amboy, on February 18. Both men were called in to the trial. Hathaway, it is claimed, was stabbed by Hennessey in a fit of rage. Fritz Sperr's saloon is in Perth Amboy, on the street of the same name. He is the son of John C. Hennessey, of the Lehigh Valley steel company. J. E. Stricker, of Perth Amboy, represents Hathaway. Mr. Peter F. Daly, of this city, is counsel for Hennessey.

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HOSPITAL FUND

The following is the list of contributions to the hospital fund to date:

Evening News.....	\$10.00
C. G. Baldwin.....	10.00
G. M. Baldwin.....	5.00
John C. Henry.....	5.00
W. B. Pratt.....	10.00
A. Friend.....	1.00
H. L. Lawton, Hankin.....	5.00
H. V. Shaffer.....	1.00
Anonimous.....	3.00
Rev. J. L. Lancaster.....	10.00
J. P. Koyen.....	1.00
Clara Houlder.....	1.00
L. Singer.....	1.00
Castl.....	1.00
Miss H. A. Manning.....	5.00

Mr. Blooded in Canons.

Theodore Bloodgood, of 44 Smith street, is in Camden today attending the trial in which he is suing for payment for his automatic piano, which he sold.

LOCAL ITEMS.

Miss Sadie Davis, of Jefferson street, has resigned her position at Coopers & Sons, and entered the employ of the New York and New Jersey Telephone Company.

Mrs. J. C. Goss, of 101 Greenwich street, left for the West Indies with her mother, who is seriously ill. F. Palmer, the florist, of Garden street, fell on the ice while cleaning snow and dislocated his knee. Dr. C. C. Miller, of 101 Greenwich, and after went to the hospital. He is in a bad way.

Patrolman John W. Mashow is duty with a lame ankle, due to a fall while on duty. His partner, Patrolman F. VanPelt is quite ill at his home, Reeder street, with peritonitis.

Jersey City's Coal Head.

RAIL LAKE CITY, Feb. 3.—While bumping along at a rufftate rate Mr. Lally Langtry held on to the tea table in the dining room of the Hotel Whitefield of the Plymouth colony.

Colonel C. W. Whitney, of the Whitefield seminary, East Hanover, and after went to the hotel. He took a two year's leave course at Harvard and is now back again.

Mr. Whitney came of a distinguished family. His father, Dr. John C. Whitney, who died in 1902, was born in 1828, and died in 1902, and his mother, Mrs. Richard Saltstall, then 76, who fought valiantly against the French and the Indians at Crown Point, died in 1902.

Colonel C. W. Whitney is a son of the late General James Steelyard Whitney, father of William C. Whitney.

Colonel C. W. Whitney has remained private practice and three years later entered the school of Grover Cleveland as secretary to the president. He is a dominant feature of Mr. Whitney's character was a craze for recognition, and he would do anything to get it. He wanted to right them. It was his mental reaction to take some thought to solve it in his own satisfaction.

Therefore when he took charge of this sort of effort, he recognized the hairy. He did not new what he was doing, but his party of friends, has arrived in this city from New York. He received news of his mother's death and at once retired to his room, leaving word that no visitors would be received.

Colonel C. W. Whitney has a son, who is well known physicians and health officers among the number being Dr. C. G. Morgan, son of George H. Hale Morgan, who has been in the medical field for many years.

The influence of the party included physicians and health officers, such as Tampon, Linian, Cruz and others.

A thorough inspection of these offices will be made and the campaign of education will be begun.

Trees Crushed by Water Tank.

CHICAGO, Feb. 3.—In a collision between a crowded passenger train and a switch engine careened into the side of the train as the latter was leaving the station at Ashland avenue with the car platform.

The train had just started from the passenger engine from its fastening on the platform behind the engine. The two men who were killed were standing on the platform and were crushed to death.

Both were crushed to death.

Canal Access to Lake Superior.

INDIANAPOLIS, Ind., Feb. 3.—After days of ardent negotiations between Great Britain and the United States, England is impressed to the extent of being intriguant attracted much attention and comment. Some of the saying neice would become certain if Great Britain and the United States had agreed to the joint conference before the end of the month.

Intentionally he committed one of the most secret of his acts, he had not yet

arrived at the time he had been

guilty of at this time, he had been

PERTH AMBOY EVENING NEWS, FRIDAY, JANUARY 6, 1897

SOUTH AMBOY.

HEALTH BOARD MEETS.

Health of the Community.

The regular meeting of the Board of Health was held at the Hotel Thursday night. There were several committees appointed, and much attention by the board. Quite a lengthy discussion took place in reference to the condition of the streets in the borough and the conclusion arrived at that it would be necessary to obtain a good sanitary code. In the opinion of the board they did not wish in any way to interfere with the work of the Board of Health, but if they would do the best they could for the community the Board of Health, the sanitary condition of the borough would be greatly improved. The action of the board in this regard, with the authorities and the people of the town, will help to remove sickness in the borough at the present time. The board has been doing its duty and have not been for the past six weeks. This is a pleasant contrast to the condition of the past, for the general health prevailing throughout the borough.

HUT AT POWDER WORKS.

George Allen, superintendent of the Powder Works at Perth Amboy who met recently with his wife and son, met with quite a serious accident yesterday. He was working in a tank containing acid up a grade of a conveyor belt when he slipped and fell, bruising his limb. He was taken to the hospital where he was operated upon and is now recovering in Glen Ridge.

MURKIN HARRIS.

Murkin Harris, of Cliff road, returned to his home after spending a few days in New York visiting friends. Mr. and Mrs. Charles M. Cooper, of Cliff road, were also in New York city for the week.

JOHN C. FOWLER.

John C. Fowler, of East avenue, is recovering from his recent illness. He was at the office of the U.S. Postmaster when he had a severe attack of rheumatism and bending his side extremely, as well as bending his head down. He was unable to make such an exertion as to cause double vision.

While the accident was an exceedingly bad one, it is, at the same time, a good omen. Dr. John C. Fowler, of Perth Amboy might have been entirely blind, but was as otherwise seriously injured.

FOUND WHAT HE WANTED.

Henry Gydron, who has been a Post Master here, found disorderly New Year's day. Some time previous it suggested to him that he should seek medical advice of August Behn, and after filling up with a dose of the latter he was not present just as this time and Mrs. Behn, his widow, who often accompanied Gydron in the house, but he slipped her a soft word, and a most gentle spirit, could not stand for such an insult. Gydron soon found himself in such a situation that he was wholly unable to get away. Dr. Behn, however, gave Gydron a good dose of water, which he may not have been able to bear.

BELMONT AVENUE CHAUFFEUR.

At the last meeting of the borough council attention was called to the conduct of a chauffeur who was driving in Belmont avenue, it being stated it was from three to seven inches off the curb. The council voted to have this avenue world certarily be impressed with the fact that the conduct of the course the work is not completed, but is still in progress. The conduct is disgraceful and is certainly not at proper grade. The chauffeur, however, brought to the attention of the public that he had been a chauffeur for a number of years, and that he had a most gentle spirit, could not stand for such an insult. Gydron soon found himself in such a situation that he was wholly unable to get away. Dr. Behn, however, gave Gydron a good dose of water, which he may not have been able to bear.

AT THE METHODIST CHURCH.

Continued enthusiasm is being manifested in the services being held in the M. E. church. Each night there is a large audience, and an increase in attendance, last evening about double that of the previous one. There will be a special concert on Saturday evening, and the organists, men and boys only, at which the organ has been put in great repair, and the organists are well founded ro-

LEAFLET LETTERS.

The frame of the new building in Leaflet street is in position for the erection of the roof. The factory manufactures of needles and hardware. Perth Amboy appears to be progressing.

South Amboy Wants.

House to let in Mechanicville near new bridge. Inquire of J. Deford, hotel, 100-12-23-1.

Frost Heat—Two furnished rooms, ladies, in private house, R. P. Mason, 42 First street, 608-12-23-1.

For Sale—13-inch Cole's hot blower, size 14x25 inc. radiator, tube of R. P. Mason, 42 First street, 608-15-23-1.

L. PERLMAN
JEWELER
State and Smith Streets.
Car. New Brunswick Ave.

SOUTH AMBOY.

SEWAREN.

DIED OF FRIGHT.

Old Woman Dies from Attacks by Gang of Looters.

Again we are compelled to report a death caused by the acts of a gang of loafers that infest almost every section in the vicinity of Newark. A woman, aged about forty-five years of age, who lived alone in a house of questionable character, was beaten by a gang of hoodlums one day this week in her home. No one was present except the old woman, but the old lady was so frightened that she could not get out of the house, where she became unconscious and died. The coroner said death was caused by fright, and the case seems almost impossible to check the identity of the persons responsible. We hope to learn more.

It is thought that it might be a wise thing to organize some of these perceptions of the community to prevent such disasters and have not been for the past six weeks. This is a pleasant contrast to the condition of the past, for the general health prevailing throughout the borough.

KNIGHTS OF CYRUS.

The Knights of Cyrus basketball team will meet the Knights of Pythias basketball team, tomorrow night, in their hall in the Lehman building in K. of P. hall on Broad street. The game will begin at 8 o'clock. Dancing will follow the game.

ARROWS DEFEATED.

The Arrows, of Perth Amboy, defeated the Arrows, of Brooklyn, in their first game. The Arrows, of Brooklyn, will be organized next week. They held their first practice on this evening.

TOTTENVILLE.

K. OF P. BASKETBALL.

VOLUNTEERS INSTALL.

Woodmen Camp Had a Big Time Last Night.

The Knights of Pythias basketball team will meet the Knights of Pythias basketball team, tomorrow night, in their hall in the Lehman building in K. of P. hall on Broad street. The game will begin at 8 o'clock. Dancing will follow the game.

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ON HIGHLIGHT LIST.

Sergeant John L. Pease, of the Knights of Pythias, of the eighth-first precinct police station, William H. Pease, sergeant, Hugh J. Canes, of Stapleton, both volunteers, and John J. O'Farrell, of the 10th Precinct, were appointed to captain. Both of the last named were chosen because they have been appointed to the force before Richmond became a part of the greater New York city.

AGRICULTURAL SOCIETY.

The annual meeting of the stockholders of the Richmond Agricultural Society will be held Monday, January 14, at the office of the Agricultural Society, at 8 o'clock p.m., for the election of officers and the consideration of additional ways and means will be devised to increase interest in the society. All are invited to be present at the meeting.

EX-TELEGRAPH CO. DISBANDS.

At the last of the old Edgewater volunteer companies to disband is the Ex-Telegraph Hook and Ladder Company, which was organized last week, and, after donating part of the company's money and other things to the Red Cross, the members and St. Vincent's hospital at West New Brighton, this radue was divided among the members.

PEACEFUL ELECTION.

The reason for the long delay in holding up the elections was in getting the money for the house while the city took over a year.

Enterprise was one of the oldest companies in the department, and had a long and honorable record.

ST. PAUL'S ELECTION.

The regular monthly business meeting and election of officers of the St. Paul's Methodist Episcopal Church was held in the chapel of the church on Wednesday evening. The officers elected: J. P. Edwards, president; Edwin C. Preacher, adviser; Heusten, J. W. Brewster, Edward Carrott, escort; George Taylor, usher; Andrew E. Edwards, treasurer; C. J. Jacobs, manager for one year; P. J. Walker, sexton.

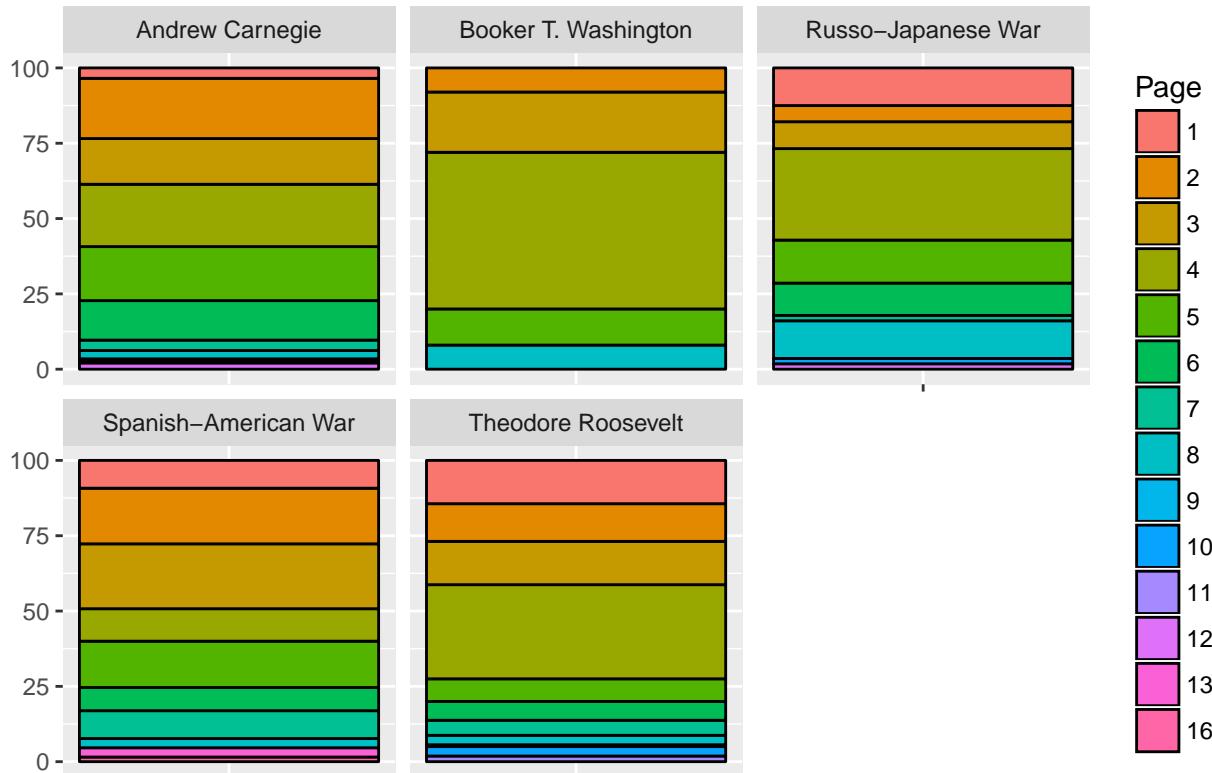
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FRIDE'S DE LIS EUCHEE.

The funeral of Eliza Euche, 85, was entertained at the home of Mrs. Harry E. Sprague, in Main street, on Wednesday afternoon. The afternoon was spent in quiet. Refreshments were served. The following were awarded prizes: Mrs. H. E. Sprague, first prize; Mrs. John M. Chapman, second; Mrs. A. M. Donaldson, third; Mrs. John M. Chapman, fourth; Mrs. John M. Chapman, fifth; Mrs. John M. Chapman, sixth; Mrs. John M. Chapman, seventh; Mrs. John M. Chapman, eighth; Mrs. John M. Chapman, ninth; Mrs. John M. Chapman, tenth; Mrs. John M. Chapman, eleventh; Mrs. John M. Chapman, twelfth; Mrs. John M. Chapman, thirteenth; Mrs. John M. Chapman, fourteenth; Mrs. John M. Chapman, fifteenth; Mrs. John M. Chapman, sixteenth; Mrs. John M. Chapman, seventeenth; Mrs. John M. Chapman, eighteenth; Mrs. John M. Chapman, nineteenth; Mrs. John M. Chapman, twentieth; Mrs. John M. Chapman, twenty-first; Mrs. John M. Chapman, twenty-second; Mrs. John M. Chapman, twenty-third; Mrs. John M. 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Chapman, one hundred and thirty-third; Mrs. John M. Chapman, one hundred and thirty-fourth; Mrs. John M. Chapman, one hundred and thirty-fifth; Mrs. John M. Chapman, one hundred and thirty-sixth; Mrs. John M. Chapman, one hundred and thirty-seventh; Mrs. John M. Chapman, one hundred and thirty-eighth; Mrs. John M. Chapman, one hundred and thirty-ninth; Mrs. John M. Chapman, one hundred and forty-first; Mrs. John M. Chapman, one hundred and forty-second; Mrs. John M. Chapman, one hundred and forty-third; Mrs. John M. Chapman, one hundred and forty-fourth; Mrs. John M. Chapman, one hundred and forty-fifth; Mrs. John M. Chapman, one hundred and forty-sixth; Mrs. John M. Chapman, one hundred and forty-seventh; Mrs. John M. Chapman, one hundred and forty-eighth; Mrs. John M. Chapman, one hundred and forty-ninth; Mrs. John M. Chapman, one hundred and fifty-first; Mrs. John M. Chapman, one hundred and fifty-second; Mrs. John M. Chapman, one hundred and fifty-third; Mrs. John M. Chapman, one hundred and fifty-fourth; Mrs. John M. Chapman, one hundred and fifty-fifth; Mrs. John M. Chapman, one hundred and fifty-sixth; Mrs. John M. Chapman, one hundred and fifty-seventh; Mrs. John M. Chapman, one hundred and fifty-eighth; Mrs. John M. Chapman, one hundred and fifty-ninth; Mrs. John M. Chapman, one hundred and sixty-first; Mrs. John M. Chapman, one hundred and sixty-second; Mrs. John M. Chapman, one hundred and sixty-third; Mrs. John M. Chapman, one hundred and sixty-fourth; Mrs. John M. Chapman, one hundred and sixty-fifth; Mrs. John M. Chapman, one hundred and sixty-sixth; Mrs. John M. Chapman, one hundred and sixty-seventh; Mrs. John M. Chapman, one hundred and sixty-eighth; Mrs. John M. Chapman, one hundred and sixty-ninth; Mrs. John M. Chapman, one hundred and seventy-first; Mrs. John M. Chapman, one hundred and seventy-second; Mrs. John M. Chapman, one hundred and seventy-third; Mrs. John M. Chapman, one hundred and seventy-fourth; Mrs. John M. Chapman, one hundred and seventy-fifth; Mrs. John M. Chapman, one hundred and seventy-sixth; Mrs. John M. Chapman, one hundred and seventy-seventh; Mrs. John M. Chapman, one hundred and seventy-eighth; Mrs. John M. Chapman, one hundred and seventy-ninth; Mrs. John M. Chapman, one hundred and eighty-first; Mrs. John M. Chapman, one hundred and eighty-second

Percent of References per Page, Compared



We might begin thinking about this comparison by noting that the Theodore Roosevelt and the Russo–Japanese War, the active president and an ongoing conflict, get referenced much more frequently on the front page and page four, where the biggest news and editorials are found, respectively. Booker T. Washington is referenced more on page four than all other pages combined. A comparatively small proportion of references to Andrew Carnegie are front page news, but a much larger proportion of references to him are found on page two, larger than is the case for most other search phrases; this makes sense, as Carnegie's library gifts in New Jersey and the neighboring states made him newsworthy on a different scale. The Spanish American War, which had been over for five years by the start of the run of the *Perth Amboy Evening News* we're examining, has shifted from more news-focused pages to more culture-focused pages (with more data, we might generate a sequence of graphs to track this shift over time).

Collocates

Page data is useful for inferring broad, structural-level contextual patterns. But more fine-grained sense of usage at the sentence-level is often desirable as well. One accessible means of achieving this is through analysis of collocates, the strings appearing immediately before and after the desired string(s). Conveniently, we grabbed all this information in our original search in the previous workshop. We've already used collocates a bit when working with page data, but we can also find the most frequently occurring collocates across all hits in order to get a sense of the specific associations being made with a particular person, event, or topic.

```
colls <- unlist(strsplit(as.vector(hits$Collocates), "\\\\W+"))
# these lines organize the collocates into a `table` listing each element of `colls` with
# its number of occurrences, `sort` high to low, and show only the 25 most occurring

sort(table(coll), decreasing=TRUE) [1:15]
```

```

## colls
##   the      of carnegie      to      a andrew      and      for
##   355      220     174      153      147     130      109      90
##   in       i      is      s      000      by      at
##   90      73      68      67      55      51      50

```

There's quite a lot of static here; selecting only the elements of `colls` that contain more than three characters will remove some of that.

```

top_colls <- colls[which(nchar(colls) > 3)]
sort(table(top_colls), decreasing=TRUE)[1:15]

```

```

## top_colls
## carnegie      andrew      that      with      from      have      will
##    174        130        47        27        24        21        20
##   been president      library      york      drew      here      said
##    19         19        18        18        15        15        14
##   this
##    14

```

That helped, but there's still too much clutter. This time, we'll use a stop list - a list of common words that we don't want gumming up the works - to cull a bit more.

```

stoplist <- readLines("https://algs4.cs.princeton.edu/35applications/stopwords.txt")
top_colls <- top_colls[-which(top_colls %in% stoplist)]
# exclude (with `--`) all elements in `top_colls` that are also `%in%` the stoplist

sort(table(top_colls), decreasing=TRUE)[1:26]

```

```

## top_colls
## carnegie      andrew      president      library      york      drew
##    174        130        19        18        18        15
## college      gift       lias      building      fund      public
##    13         13        12        11        11        11
## made      march      april      london      received      years
##    10         10        9         9        9         9
## announced      give      home      state      states      steel
##    8          8         8         8         8         8
## united      university
##    8          8         8

```

While this gets rid of some real words, it leaves us with more semantically meaningful ones. And indeed, in the case of Andrew Carnegie, this data is interesting: already his steel career has been superseded by his philanthropic career and his union-breaking activities by his altruistic activities. This would not be the case if our dataset was focused fifteen years earlier.

You can probably already imagine the utility of comparative collocates analysis: are the top collocates different in different newspapers (with different political investments or publishing locations)? Which collocates rise and fall over time? You can also probably already imagine the utility of combining collocates analysis with page location analysis: how do the top collocates differ for different pages? All this is outside the scope of this workshop, but there's one more technique to analyzing newspaper data that I'd like to introduce.

Uniqueness

If not all references are created equal, at least some of them sure look identical. Nineteenth century newspapers regularly reprinted material, whether that material had been written for a previous issue of the same paper,

paid for by an advertiser or subscriber, or taken from another newspaper (with or without attribution). Ascertaining the number of reprints - the degree of uniqueness of reference - is thereby another important means of analyzing broader patterns of relevance.

Since our collocates data is as messy as the newspaper OCR it's drawn from, we can't just run an exact match. You guessed it: it's time to get fuzzy again, this time with `adist`, a function that measures the approximate distance (Levenshtein Distance) between any two strings.

In order to make sure things don't take too long, we'll wrap our code in a function that distributes the workload across multiple processor cores.

```
unique_par <- function (input) {
  core_num <- detectCores()-1
  clust <- makeCluster(core_num, outfile="")
  clusterExport(clust, varlist=c("input"), envir=environment())
  result <- parLapply(clust, seq_along(input$Collocates),
    function (x) {
      if (length(which(adist(input$Collocates[x], input$Collocates) <80)) >1) {
        "No"
      } else {
        "Yes"
      }
    })
  # this is the line doing the work: for each collocates string, we check `which`, if any,
  # of all the other collocates string is an approximate `adist` match - in this case,
  # within a Levenshtein Distance of 80. If there is one or more match, the function
  # returns "No"; if there are no matches, the function returns "Yes"

  stopCluster(clust)
  return(result)
}
```

We'll assign the results of this uniqueness check to a new column in the `hits` data frame, `Unique`, so that these values remain tied to the hits to which they correspond. This will take a minute or two to run.

```
hits$Unique <- as.character(unique_par(hits))
# this runs our uniqueness function and makes sure the results are characters
```

To check if our data includes any reprints, we'll index the vector of all rows that are not unique into our `hits` data frame.

```
hits[hits$Unique=="No", -7]
```

	LCCN	Year	Month	Day	Page	Issue_Length	Unique
## 6	sn85035720	1904	3	9	seq-4	6	No
## 7	sn85035720	1904	3	10	seq-4	6	No
## 8	sn85035720	1904	3	11	seq-8	10	No
## 9	sn85035720	1904	3	12	seq-4	6	No
## 10	sn85035720	1904	3	14	seq-4	6	No
## 11	sn85035720	1904	3	15	seq-4	6	No
## 12	sn85035720	1904	3	16	seq-4	6	No
## 13	sn85035720	1904	3	17	seq-4	6	No
## 14	sn85035720	1904	3	18	seq-8	10	No
## 15	sn85035720	1904	3	19	seq-4	8	No
## 16	sn85035720	1904	3	21	seq-4	6	No
## 17	sn85035720	1904	4	2	seq-2	6	No
## 18	sn85035720	1904	4	4	seq-2	6	No

```
kable(hits[hits$Unique=="No",7])
```

x

you only save a nickel harvard lampoon tho north western line russia japan atlas send ton cents in stamps for kusso japanese war alls issued by the t chicago north western it y three lino colored maps each 14x20 bjnnnd in convenient form

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cuts bruises sting sprains monarch over pain the north western line russia japan atlas soml ten cents in btamps for ltusso japanese war alls issued by the t chicago nortli western r y throe fine colored maps each 14x20 bound in convenient form

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try it sold at sexton s pharmacy the north western line russia japtn atlas send ten cents in stamps for russo japanoso war alls issued by tho t chicago north western r y three fine colored maps each 14x20 bonnd in convenient form

remedy for coughs ami colds the north western line mos a jap in atlas send ten cents in stumps for rufso japanese war alls issuod by the l chicago north western lt y throe tine colored maps each 14x80 boond in convenient form

it bold at sexton s pharmacy he north western line huss a japan atlas send ten cents in stamps for knsso lapancse wnr alls issued by the t chicago north western r y chroe fine colored maps each 14x20 bound in convenient form

jersey fence co mount nolly n j the north western line russia japan atlas send ten oents in stamps for russo japanese war alls issned by the t ohloago north western it y three fine ooored maps each 14x20 bennd in convenient form

jersey fence co mount houy n j the north western line russia japan atlas send ton cents in stamps for kusso japanese war alls issued by the t ohioago nortli western r y throe fine colored maps eaoli 14x20 bound in convenient form

For some searches, there may appear to be no reprinted material in the *Perth Amboy Evening News*. This result is misleading, however, when working with only one newspaper to begin with. It is almost certainly true, to take Jack London as an example, that the *Evening News*'announcements of magazines' contents for the month were reprints of the standard announcements found in newspapers across the country. Uniqueness analysis won't reflect this unless the data includes several newspapers, ideally five or six from the same time span.

This is not the case, however, for references to the Russo-Japanese War. There are nine hits, mostly from the same month, that are clearly all the same reprint - not of news per se but of a particularly topical advertisement.

But reprints aren't semantically meaningless!⁵ They should never be excluded from data; rather, we should try to ascertain what kind of content and conditions cause an article referencing our name or phrase to be reprinted.

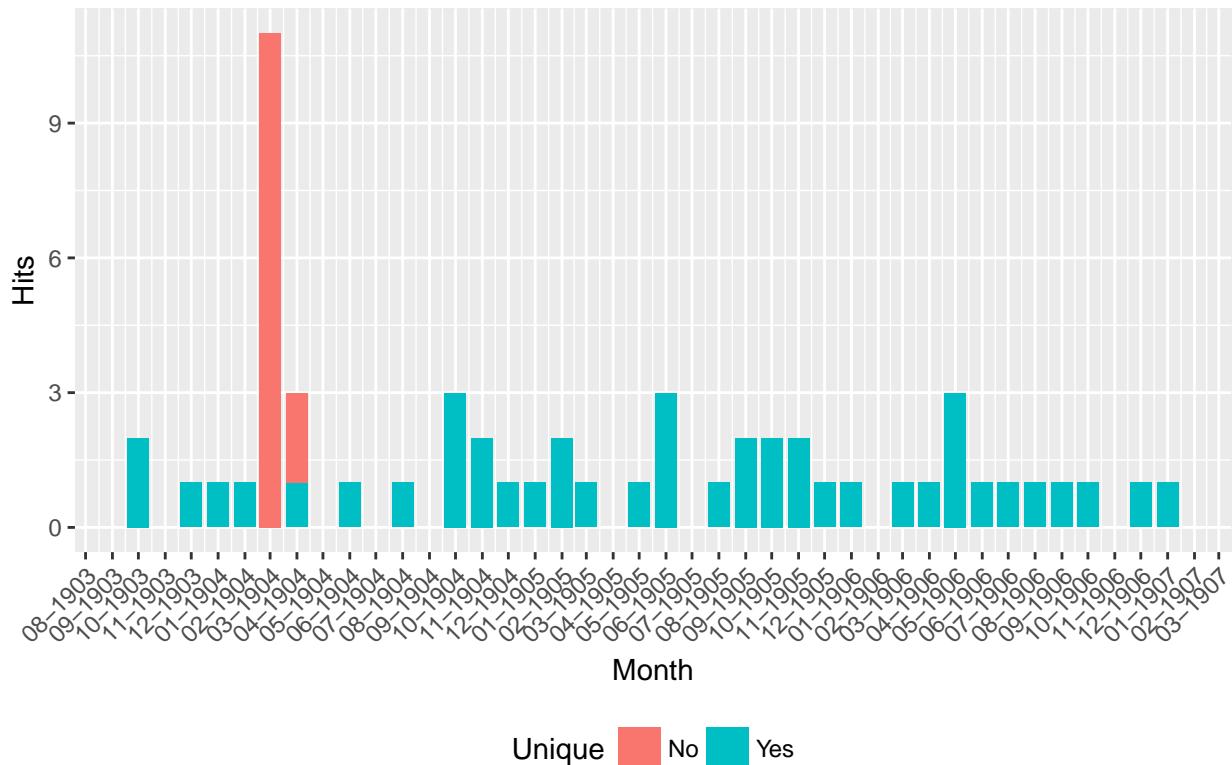
To begin to do so, we can graph temporal distribution again with the addition of designating uniqueness as a categorical variable. When working with enough newspapers, this would illustrate the approximate proportion of original references.

```
plot <- hits %>%
  group_by(Unique, Year, Month) %>%
  summarize(Total=n())
plot$date <- as.Date(paste(plot$Year, plot$Month, "01", sep="-"), format="%Y-%m-%d")

plot %>%
  ggplot(aes(x=Date, y=Total, fill=Unique)) +
  geom_bar(stat="identity") +
  # the `fill` parameter is removed from `geom_bar` and added to `ggplot` to correspond
  # with the `Unique` column of our data frame

  scale_x_date(date_breaks = "month", date_labels=( "%m-%Y")) +
  theme(legend.position="bottom") +
  labs(x="Month", y="Hits") +
  ggtitle("References to the Russo-Japanese War") +
  theme(plot.title = element_text(face="bold", size=rel(1.5))) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```

References to the Russo–Japanese War



Without distinguishing between reprints and ostensibly non-reprinted material, we might have concluded that the spike in references in March-April 1904 was editorial content or at least news (in the strict sense) about the Russo-Japanese War, which had just begun in February (earlier references are to the “possibility of a Russo-Japanese War”). Instead, advertisements make up a greater deal of the initial hullabaloo, even if they burn out much more quickly (to my knowledge, these reprints are the only advertisements pertaining to the Russo-Japanese War in the *Perth Amboy Evening News*).

If you'd like to keep the additional information we added to your `hits` data frame today, be sure to save it:

```
write.csv(hits, "name-this-file.csv")
```

Finally, we would really appreciate it if you took a minute to [fill out our brief feedback survey](#).

Thanks for participating!