

WHAT'S ON THE MENU?

**ANALYZING RESTAURANT MENUS
FROM 1850-PRESENT**

FAITH PLATZ



RESEARCH QUESTIONS

OVER TIME,

1. HOW AND WHY HAVE PRICES AT RESTAURANTS CHANGED?
2. WHICH DISHES ARE THE MOST POPULAR?



THE DATA

NEW YORK PUBLIC LIBRARY (NYPL) RARE BOOKS DIVISION

- Initiative launched in April 2011
- Transcribed by volunteers, not OCR

CURRENT DATASET

- 17,545 menus from 1851-2015
- Dataset is occasionally updated with new menus

EXAMPLE MENUS

Naething Bros. (1900)

1900-248

BILL OF FARE.	
OUR DAIRY.	
Butter Bread and Milk.....	10c.
Wheat Bread and Milk.....	10c.
Whole Bread and Milk.....	10c.
Outward and Milk.....	10c.
Rice and Milk.....	10c.
Farina and Milk.....	10c.
Starchy and Milk.....	10c.
Wheaten Grits and Milk.....	10c.
Zestark and Milk.....	10c.
Cookers XXXI and Milk.....	10c.
Outward Crackers and Milk.....	10c.
Outward Crackers and Milk.....	10c.
Starchy White Wheat Flaxseed with Milk.....	10c.
TEA, COFFEE, &c.	
Coffee, per Cup.....	5c.
Tea, per Cup.....	5c.
Coffee or Tea with Milk, separate.....	7c.
Chocolate, per Cup.....	5c.
Milk, per Glass.....	5c.
Milk, per Bowl.....	5c.
Butter Milk.....	5c.
CAKES.	
Tea Biscuits.....	5c. each
Cookies.....	5c. "
Buns.....	5c. "
Dropbreads.....	5c. "
Seedbreads.....	5c. "
Cup Cakes.....	5c. "
Roll Cakes.....	5c. "
Yeast Buns.....	5c. "
Milk Buns.....	5c. "
Albany Buns.....	5c. "
Yeast Buns.....	2 for 5c.
Corn Cakes.....	5c. each
Spice Cakes.....	5c. each
Seed Cakes, Vanilla.....	5c. "
Cream Cakes.....	5c. "
Lemon Cakes.....	5c. "
Cinnamon Cakes.....	5c. "
Fruit Cakes.....	5c. "
Rolls.....	5c. "
Paper Pound Cakes.....	5c. "
Gingerbreads.....	5c. "
Jambines.....	5c. "
Lemon Slices.....	5c. "
Seed Cakes.....	5c. "
PIES.	
Apple.....	5c.
Mince.....	5c.
Lemon.....	5c.
Plum.....	5c.
Lemon Cream.....	5c.
Peach.....	5c.
Cherry.....	5c.
Custard.....	5c.
Comet.....	5c.
Pumpkin.....	5c.
Hot Opated Pie.....	10c.
Hot Cran. Pie.....	10c.
Home-Made Pie, per	10c.
Hot Fruit Pie in Season.....	10c.
PASTRY AND FANCY CAKES.	
Apple Cake.....	5c.
Hamburger Apple Cake.....	5c.
Cherry Cake.....	5c.
Sponge Cake.....	5c.
Plum Fruit Cake.....	5c.
Baker's Pound Cake.....	5c.
Corn Pound Cake.....	5c.
Chocolate Biscuits.....	5c.
Napoleons.....	5c.
Cream Buns.....	5c.
Apple Buns.....	5c.
Showerbuns.....	5c.
Fruit Cakes.....	5c.
Orange Cakes.....	5c.
Cup Cakes.....	5c.
SANDWICHES.	
Ham.....	5c.
Roast Beef.....	5c.
Swiss Sandwiches.....	5c.
Cold Tongue, per Plate.....	10c.
Corned Beef.....	5c.
Cold Ham, per Plate.....	10c.
Cold Corned Beef, per Plate.....	10c.
BREAD, 5c.	
Yeast.....	5c.
Butter Bread.....	5c.
Wheat.....	5c.
Rye.....	5c.
Graham.....	5c.
BUTTER, 5 CENTS PER PLATE.	
ICE CREAM, 10c.	
Vanilla.....	10c.
Chocolate.....	10c.
Neapolitan.....	10c.
Any institution on the part of the Waiters please report at the Cashier's Desk.	

11 Jan. 1900.

The Waldorf Astoria (1949)

"Will you help conserve New York City's water supply? Because of the continued shortage of water, we will serve you water only upon request. Thank you."

Appetizers	
Cape Code 75	Blue Points 70
Smoked Nova Scotia Salmon 1 00	V-8 Cocktail 30
Sea Food 1 60	Caviar 3 25
Tomato Juice 30	Cocktails: Shrimp 1 20
	Crab Meat 1 50
	Lobster 1 90
Soups	
Cream of Caviar 50	Chicken Broth with Vermicelli 45
Onion au Gratin 45	Chicken Broth 40
	Clam Stew 80
Eggs	
Sliced on Cut Asparagus 60	Omelette with Creamed Crab Meat 1 25
	Sherried with Lamb Kidney 1 05
From Home Kitchen	
Calf's Liver and Bacon, Baked Potato, Fresh Spinach.....	1 95
Cheese Omelette.....	1 25
Hot Mince Pie 60	Sliced Bananas with Fruit Jelly 45
*Any Customary Home-Cooked Dish will be prepared to order	
Fish	
1—GLAZED FILETS OF LEMON SOLE WITH WHITE WINE, JULIENNE OF MUSHROOMS AND TRUFFLE 1 60	
2—Codfish Cakes, Hollandaise and Leaves of Spinach 1 50	
3—Poached Filet of Salmon, Sauce Auguste 1 90	
4—Sea Trout, Meuniere with Mushrooms, Shrimp and Capers 1 90	
5—Broiled Striped Bass, Maître d'Hôtel and Potato Sliced in Cream 1 90	
Entrées	
6—CURRY OF CHICKEN (white meat), PILAFF RICE AND CHUTNEY 2 10	
7—Loin Lamb Chop, Mixed Grill with Bacon, Tomato and Allumette Potatoes 1 90	
8—Risotto of Capon Livers with Mushrooms and Sausage 1 40	
9—Browned Corned Beef Hash with Egg Turnover 1 40	
10—Pork Tenderloin, Sour Cream Sauce and Glazed Apples 1 00	
To Order	
Steak Mince 4 00	Filet Mignon 5 25
Loin Lamb Chop 1 90	Half Broiled Chicken 2 25
Hamburger Steak 2 30	Broiled Lobster, Colbert Sauce 3 50
Room Service Luncheon	Room Service Dinner

Four Seasons Hotel (2004)

Dessert Wines	
Glass Selections	
654 Kracher #1 Beerenauslese Cuvee 2002	18. glass 72. bottle
642 Inniskillin Pearl Label Ice Wine 2002	20. glass 80. bottle
Bottle Selections (375 ml)	
661 Kracher #9 Trockenbeerenauslese 1995 Zweigelt Rose	118.
660 Kracher #12 Trockenbeerenauslese 1995 Grand Cuvee	134.
640 Inniskillin Gold Label Ice Wine 2001	120.
641 Inniskillin Ice Wine 2001 Sparkling	120.
A Selection of Regular and Green Teas: Organic English Breakfast, Organic Earl Grey, Organic Darjeeling, Wild Blackberries, Genmaicha, Silver Jasmine (White Tea)	
A Selection of Herbal and Decaffeinated Teas: Chamomile Citron, Mint Melange, Verbena, Decaffeinated Earl Grey, Ginger Twist	



DATA STRUCTURE

FOUR SEPARATE DATA FILES

1. MENU
2. DISH
3. MENUITEM
4. MENUPAGE

I HAD TO COMBINE THEM IN A STRATEGIC ORDER

- Menu → MenuPage → MenuItem → Dish

MENU → MENUPAGE → MENUITEM → DISH

	menu_id	name	sponsor	event	venue	place
1	12463	NA	HOTEL EASTMAN	BREAKFAST	COMMERCIAL	HOT SP
2	12464	NA	REPUBLICAN HOUSE	[DINNER]	COMMERCIAL	MILWAU
3	12465	NA	NORDDEUTSCHER LLOYD BREMEN	FRUHSTUCK/BREAKFAST;	COMMERCIAL	DAMPFE
4	12466	NA	NORDDEUTSCHER LLOYD BREMEN	LUNCH;	COMMERCIAL	DAMPFE
5	12467	NA	NORDDEUTSCHER LLOYD BREMEN	DINNER;	COMMERCIAL	DAMPFE

Menu (20 var.)

	menu_page_id	menu_id	page_number	image_id	full_height	full_width	uuid
1	119	12460	1	1603595	7230	5428	510d47e4-2955-a3d9-e040-e00a18064a99
2	120	12460	2	1603596	5428	7230	510d47e4-2956-a3d9-e040-e00a18064a99
3	121	12460	3	1603597	7230	5428	510d47e4-2957-a3d9-e040-e00a18064a99
4	122	12460	4	1603598	7230	5428	510d47e4-2958-a3d9-e040-e00a18064a99
5	123	12461	1	1603591	7230	5428	510d47e4-2959-a3d9-e040-e00a18064a99

MenuPage

	item_id	menu_page_id	price	high_price	dish_id	created_at	updated_at	xpos	ypos
1	1	1389	0.40	NA	1	2011-03-28 15:00:44 UTC	2011-04-19 04:33:15 UTC	0.1114290	0.254735
2	2	1389	0.60	NA	2	2011-03-28 15:01:13 UTC	2011-04-19 15:00:54 UTC	0.4385710	0.254735
3	3	1389	0.40	NA	3	2011-03-28 15:01:40 UTC	2011-04-19 19:10:05 UTC	0.1400000	0.261922
4	4	1389	0.50	NA	4	2011-03-28 15:01:51 UTC	2011-04-19 19:07:01 UTC	0.3771430	0.262720
5	5	3079	0.50	1.0	5	2011-03-28 15:21:26 UTC	2011-04-13 15:25:27 UTC	0.1057140	0.313178

MenuItem

	dish_id	name	description	menus_appeared	times_appeared	first_appeared	last_appeared
1	1	Consomme printaniere royal	NA	8	8	1897	1927
2	2	Chicken gumbo	NA	111	117	1895	1960
3	3	Tomato aux croutons	NA	13	13	1893	1917
4	4	Onion au gratin	NA	41	41	1900	1971
5	5	St. Emilion	NA	66	68	1881	1981

Dish (9 var.)

DATA PROCESSING

INCORRECT YEARS

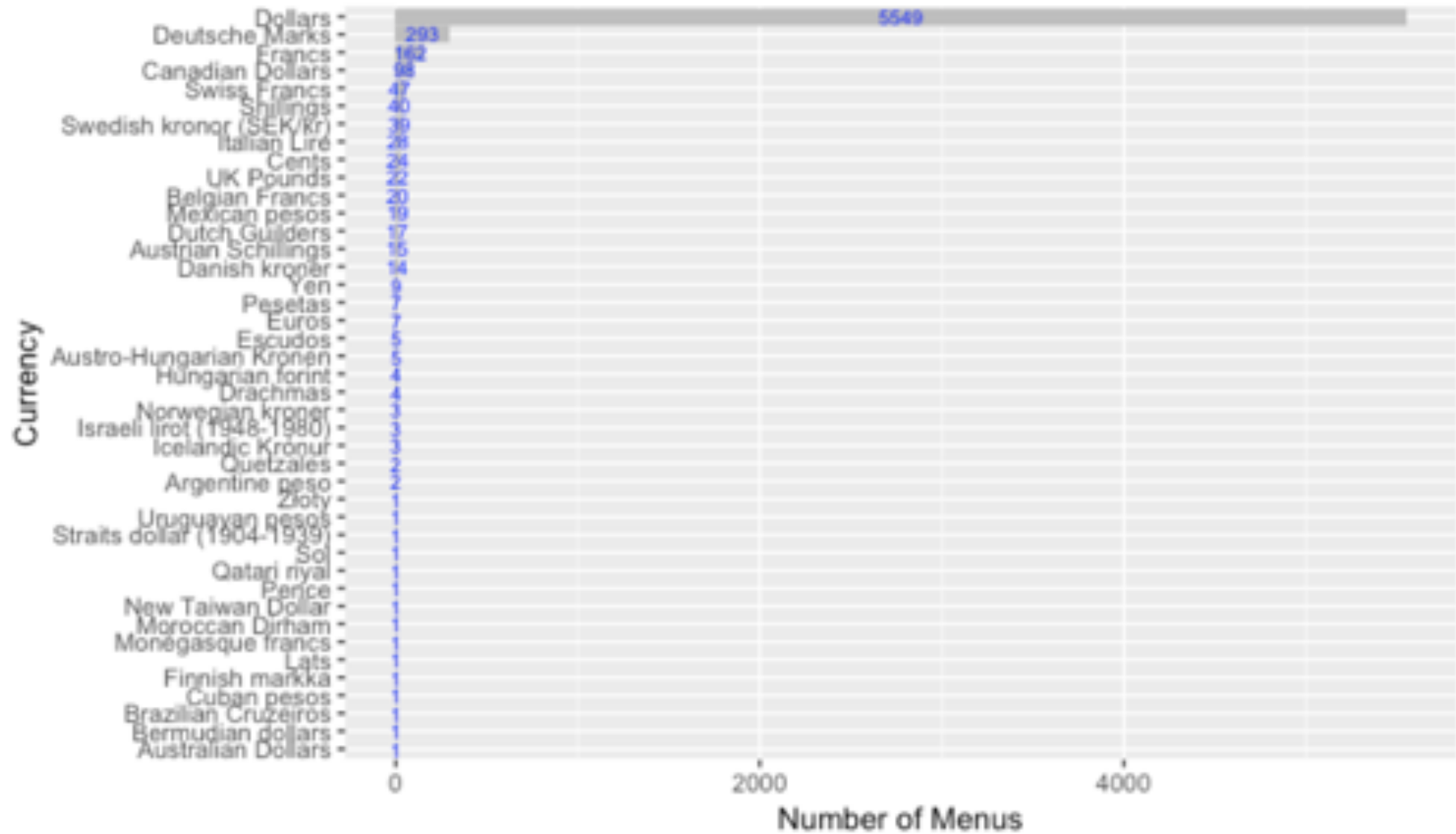
- Four instances (1, 190, 1091, 2928)
- Luckily, call number helped

CURRENCY FORMATTING

- Not all menus are American and/or use USD as its currency
- 40 different currencies

call_number <chr>	date <date>
1912-0668_wotm	0001-01-01
call_number <chr>	date <date>
1900-2328	0190-03-06
call_number <chr>	date <date>
1901-213	1091-01-27
call_number <chr>	date <date>
1918-0387_wotm	2928-03-26

Distribution of Currencies used in Observed Menus

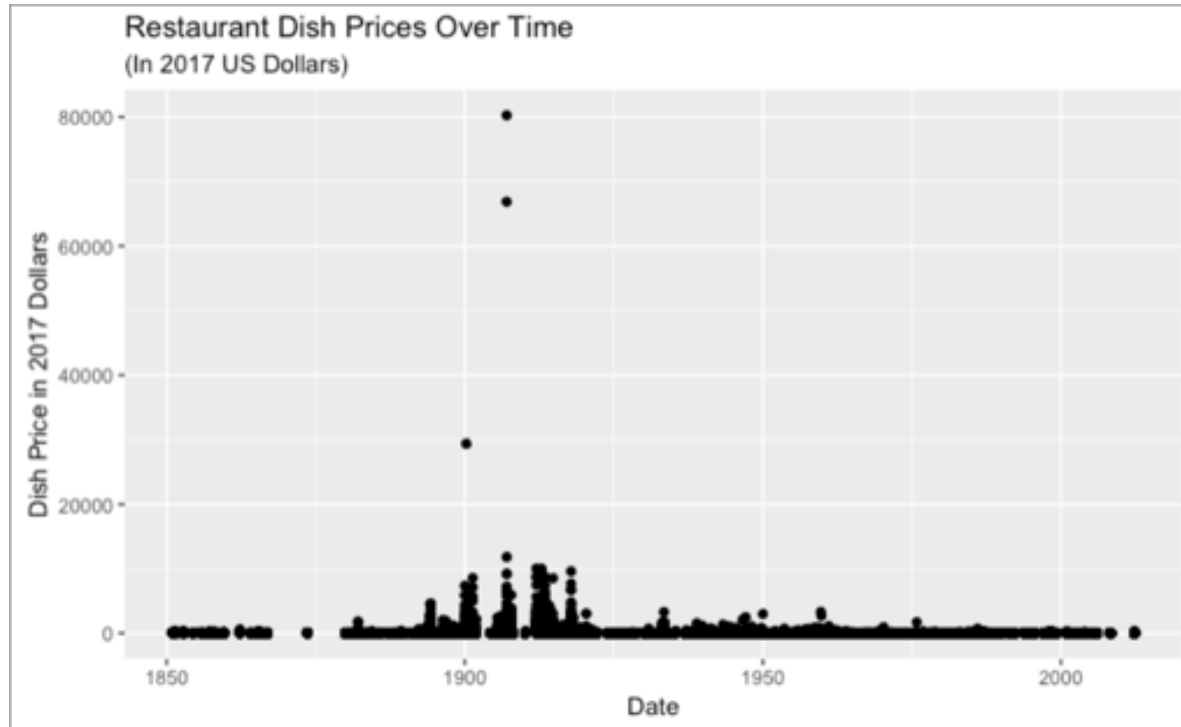




DATA PROCESSING

CONVERTING ALL PRICES TO 2017 USD

- Focused on US Dollars only
 - Used historical CPI values to adjust for inflation
 - BLS only has CPI values dating back to 1913
 - Oregon State University Political Science Dept. Estimates (1774-2028)
 - Conversion Factor: $\text{Given Year's CPI} / 2017 \text{ CPI}$



```
summary(dollar$price17)
```

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	NA's
0.00	4.72	7.50	18.07	13.46	80263.16	96665

OK, NOT SO GREAT...

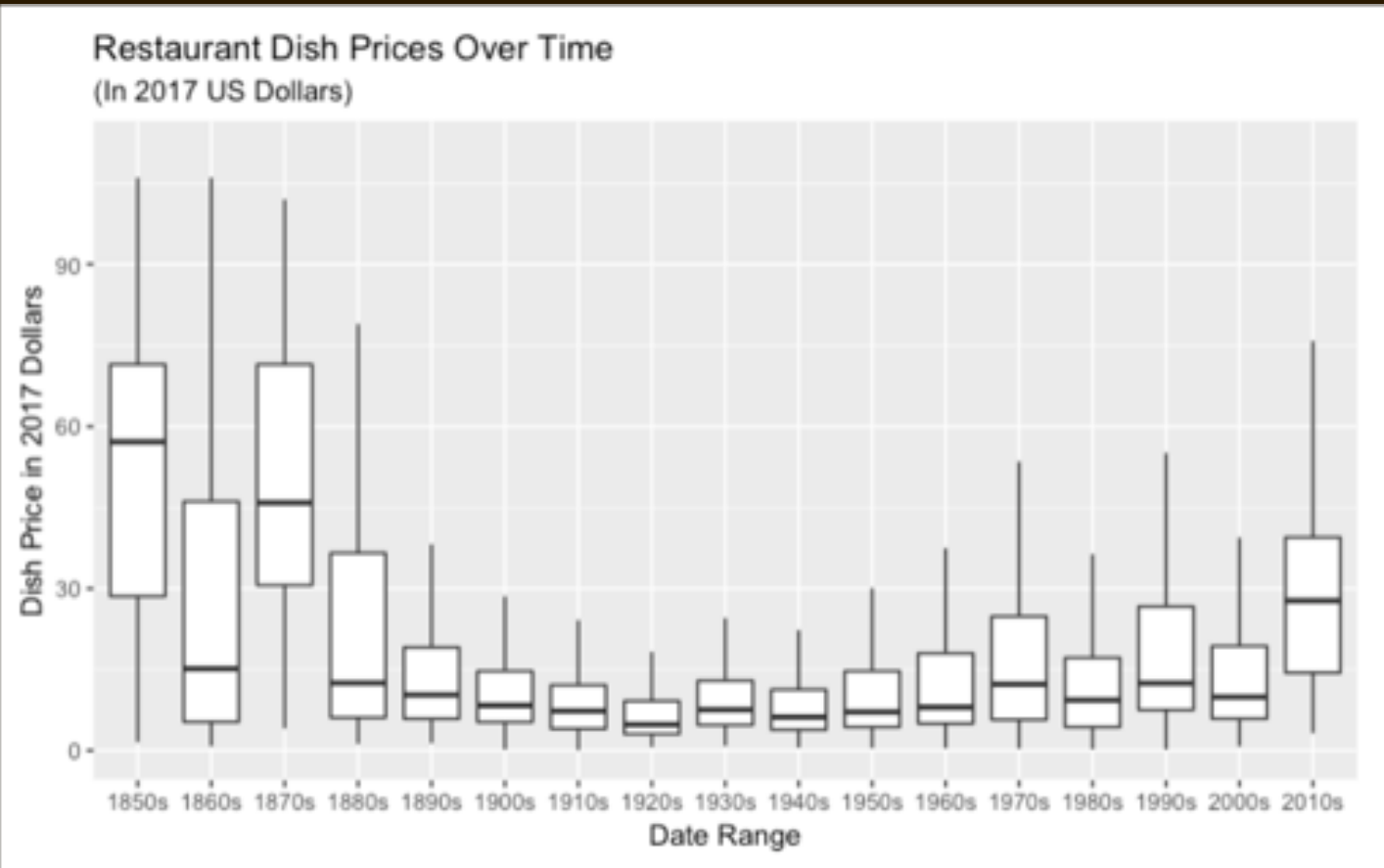
ISSUES WITH PRICES

If a price was listed as a range, issues could arise

- Grape fruit 25 – 40 (cents)
- Inputted into dataset as \$2,540 (1907)
- In 2017 USD, \$66,842.11
- That's one expensive grapefruit!!!

FRUITS				
Grape fruit 25—40 with rum, sherry or maraschino 40—60				
Assorted fruit en compôte 75	Sliced pineapple 20	Orange, each 10	Bananas 10	Mixed nuts 15
Apples 15	Raisins 15	Layer figs 20	Baked apples and cream 25	
Pears 20	Malaga grapes 25			
CHEESE				
American 10	Edam 15	Stilton 20	Cream cheese with bar-le-duc jelly 30—50	Camembert (elite) 20
Roquefort 20	Gorgonzola 20	Cream 15	Gruyère 20	Neufchâtel cheese with bar-le-duc jelly 30—50
Brie 20	Swiss 15	Old English 15	Neufchâtel 15	Neufchâtel cheese with guava jelly 40
MacLaren's Club cheese 30			MacLaren's Club cheese, individual portion 20	
Cream cheese with raspberry, strawberry, pineapple or cherry preserves 40				
ICE CREAM, Etc.				
Mixed 30	Neapolitan 30	Vanilla 20	Sliced bananas with ice cream 25	Café parfait 25
Frozen Duchess pudding 25			Ginger 20	Orange sherbet 15
Ladies' entrance to Cafe on Broadway			Ladies' Dining Room up stairs	

Solution



```
dollar %>%  
  filter(price17 > 0 & price17 <= quantile(dollar$price17, .99, na.rm = T)) %>%  
  ggplot(aes(decade, price17)) +  
    geom_boxplot(outlier.shape = NA) +  
    labs(x = "Date Range", y = "Dish Price in 2017 Dollars",  
         title = "Restaurant Dish Prices Over Time", subtitle = "(In 2017 US Dollars)")
```



WHAT WE LEARN

- **MEDIAN PRICES TENDED TO DECREASE, THEN INCREASE**
 - Lower dish counts at extremes
 - Prohibition (1920-1933)
 - Less restaurants; more diners, soda fountains, etc.
 - Great Depression (1929-1941)
- **POST WWII, PRICES STARTED INCREASING**

DISH POPULARITY

```
dishname <- m3 %>%
  mutate(dish = tolower(name.y)) %>%
  mutate(dish = str_remove_all(dish, "[[:punct:]]")) %>%
  filter(!is.na(dish))

wc1 <- dishname %>%
  group_by(dish) %>%
  summarize(appearances = n()) %>%
  arrange(desc(appearances)) %>%
  ungroup()

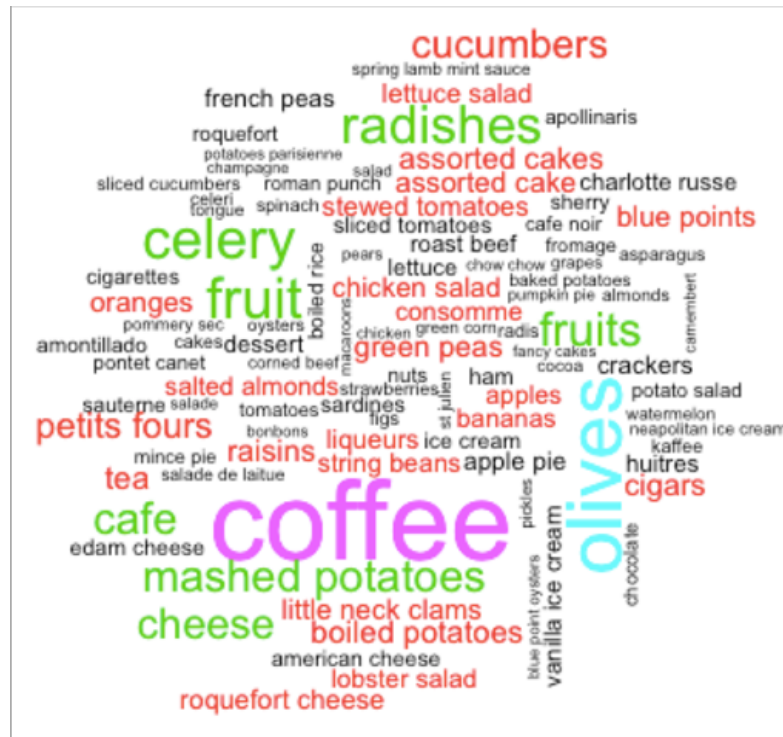
wordcloud(words = wc1$dish, scale = c(3.25, 0.25),
  freq = wc1$appearances,
  colors = 1:6, max.words = 100)
```

Top Six (357,880 Dishes; 17,513 Menus)

1. Coffee (8,795)
2. Celery (4,924)
3. Tea (4,848)
4. Olives (4,790)
5. Radishes (3,456)
6. Mashed Potatoes (3,051)



Before 1900



After 1970





LOOKING FORWARD

HOW TO USE THESE FINDINGS

- Be more aware of rising restaurant prices today
- Look for coffee!

WHAT'S NEXT?

- Focus on select dishes and see how they've changed over time
- Find a way to account for international currencies and languages
- Correct all the price issues for a more accurate analysis



QUESTIONS?