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Question 3. Part A

```
clear all;
close all;

page1 = imread('hw2_data/hw2_book_page_1.jpg');
page2 = imread('hw2_data/hw2_book_page_2.jpg');

T1 = graythresh(page1);
T2 = graythresh(page2);

binary1 = (page1 > T1*255);
binary2 = (page2 > T2*255);

figure; imshow(binary1);
title('Binary image for page 1');
figure; hold;
imhist(page1);
plot([T1*255 T1*255], [0 1e5], 'r');
title('Histogram with Otsu threshold for page 1');

figure; imshow(binary2);
title('Binary image for page 2');
figure; hold;
imhist(page2);
plot([T2*255 T2*255], [0 1e5], 'r');
title('Histogram with Otsu threshold for page 2');

% We can see that the global histogram thresholding works well enough in
% the parts of the page that have been pressed flat against the scanner.
% However, the parts that have been curved back due to the spine of the
% book, this thresholding method breaks down and we can see that the
% characters at those parts of the image aren't correctly classified.
```

```
Warning: Image is too big to fit on screen; displaying at 33%
Current plot held
Warning: Image is too big to fit on screen; displaying at 33%
Current plot held
```

SEATTLE AND THE ORIENT.

Salmon is practically every male in the Union, and the product in smoked, salted and canned fish is finding a market in all of the civilized countries of the world. The total pack of all classes of fish reached a total of 830,000 cases, and exceeded by 500,000 cases that of the previous year.

The eighteen canneries on Puget

canneries packed 874,500 cases, which amount the five canneries on the Washington side of the river to 68,800 cases, as follows:

Chinooks
Steelheads and bluebacks
Fall salmon
On the British Columbia side seventy-one canneries put up

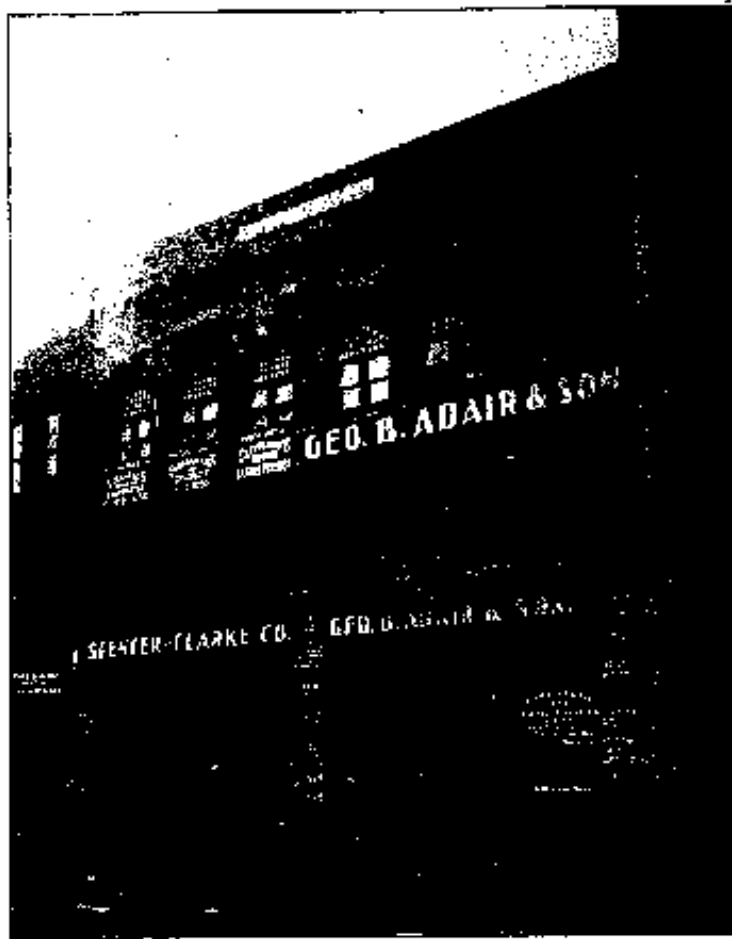


FIGURE 1: BUILDING OF SPENCER-CLARKE CO. AND GEO. B. ADAIR & SON.

Sound packed the following kinds of fish:

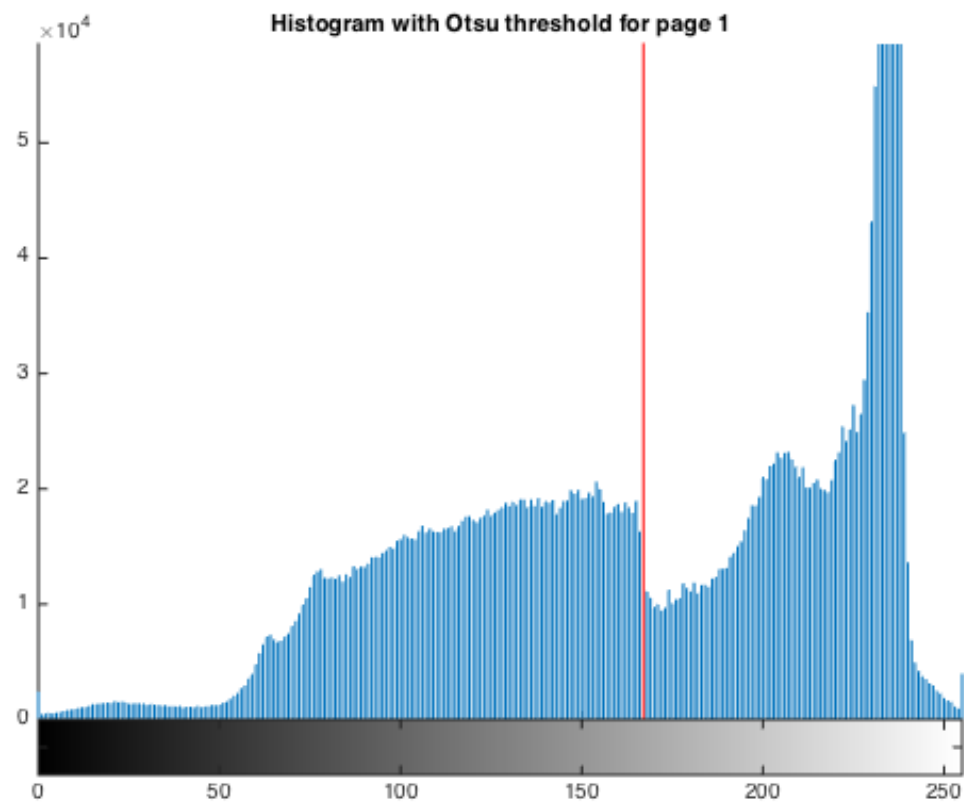
	Cases.
Sockeyes ..	528,000
Spring salmon ..	22,600
Oshos ..	103,500
Humpbacks ..	256,800
Chums ..	19,400

On the Columbia River the eighteen

766,000 cases, of which the five canneries on the Fraser river packed 528,000 cases, and the northern was 238,000 cases.

This shows the Puget sound canneries packed nearly double amount of any other locality.

In comparing the capacity of canneries in the various districts



SEATTLE AND THE ORIENT.

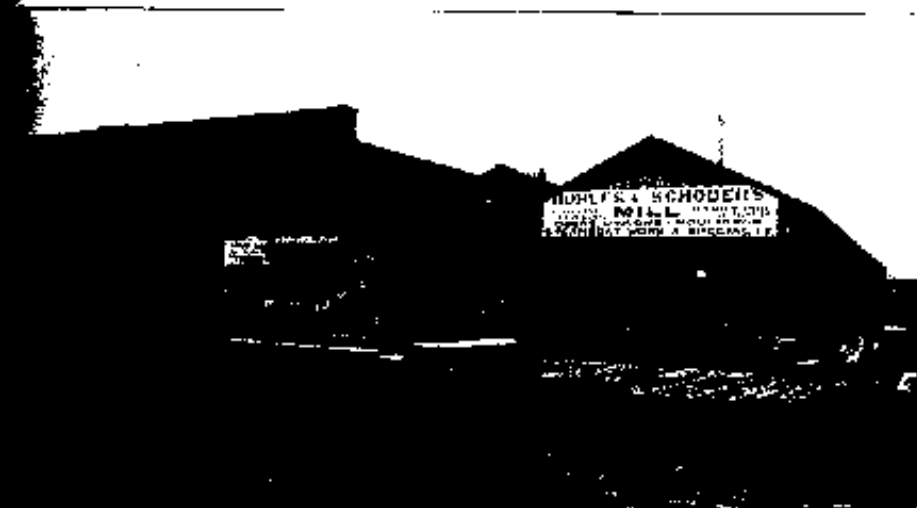
57

gust places in the city. Eleven steamboats make a landing at this wharf, and have intercourse with all ports on Puget Sound. About their work and in their warehouse they have steady employment to thirty people and during the year they will probably increase this number, at least to the extent of putting representatives on the road to travel in their interest.

ROHLFS & SCHODER.

Seattle has one of the largest bank office fixture manufacturing con-

in banks, offices, steamboats and stores and covers a pretty wide range. The firm is one of the best known on Puget Sound, and the fact that their establishment is crowded with orders and their mill is about one of the busiest places in Seattle is evidence of the standing they possess. An illustration is shown herewith which will give some idea of the size of the building they occupy, but to thoroughly appreciate the great amount of industry manifested one is compelled to make a visit through their place.

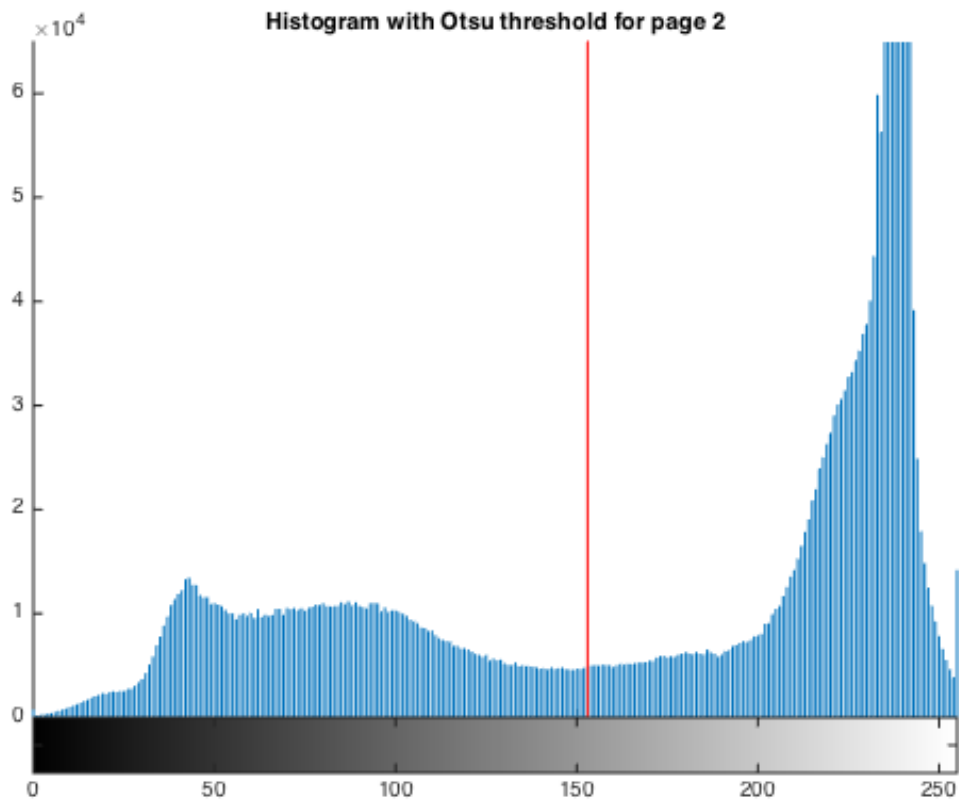


FACTORY OF ROHLF & SCHODER.

panies in the Northwest in the firm of Rohlf & Schoder. They are located at 620 First Avenue South in a building 150x150 feet in size. They have been established here since 1889 and are really the successors of the J. & Polson Furniture Company. At present time they give employment to forty people and the extent of their work is very considerable. Their production as above stated, consists of bank office fixtures, which means practically the manufacture of counters, steamboat fixtures, and all kinds of ordinary furniture, such as is used

ONE OF THE BIG MACHINE WORKS.

One of the largest and best known machine works on the North Pacific Coast is that of the Washington Iron Works Company, which occupies two and one-half blocks of land on Grant Street, in the southern part of the city. Some illustrations accompany this article, which will afford an idea of the magnitude of the plant. The one of the exterior view does not take in the entire establishment, because of the fact that the buildings in which are located the foundry are some little dis-



Question 3. Part B

```
% For Page 1
[row col] = size(page1);
varThresh = 100;
stepWidth = 16;
tileWidth = 32;

mask = ones(row,col);

for i = 1: col/stepWidth
    indCol = (i-1)*stepWidth + 1 : i*stepWidth;
    tile = page1(:, indCol);
    varTile = var(double(tile(:)));
    meanTile = mean(tile(:));
    otsuThresh = graythresh(tile);

    % Threshold based on local mean (if low variance)
    if(varTile < varThresh)
        if(meanTile < otsuThresh*255)
            mask(:, indCol) = 0;
        else
            mask(:,indCol) = 1;
        end
        continue;
    end
    mask(:,indCol) = im2bw(tile, otsuThresh);
end
```

```

figure; imshow(mask);
title('Page 1 with locally adaptive thresholding');

% For Page 2
[row col] = size(page2);
varThresh = 100;
stepWidth = 16;
tileWidth = 32;

mask = ones(row,col);

for i = 1: col/stepWidth
    indCol = (i-1)*stepWidth + 1 : i*stepWidth;
    tile = page2(:, indCol);
    varTile = var(double(tile(:)));
    meanTile = mean(tile(:));
    otsuThresh = graythresh(tile);

    % Threshold based on local mean (if low variance)
    if(varTile < varThresh)
        if(meanTile < otsuThresh*255)
            mask(:, indCol) = 0;
        else
            mask(:,indCol) = 1;
        end
        continue;
    end
    mask(:,indCol) = im2bw(tile, otsuThresh);
end

figure; imshow(mask);
title('Page 2 with locally adaptive thresholding');

% We can see large improvements when using locally adaptive thresholding.
% The non-uniform illumination is no longer a problem along the spine of
% the book. Each character is clearly identifiable.

```

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SEATTLE AND THE ORIENT.

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The eighteen canneries on Puget

canneries packed 374,500 cases, of which amount the five canneries on the Washington side of the river put up 68,500 cases, as follows:

	Cases.
Caninecks	50,500
Steelheads and bluebacks	5,500
Fall salmon	9,500

On the British Columbia side the seventy-one canneries put up a total of

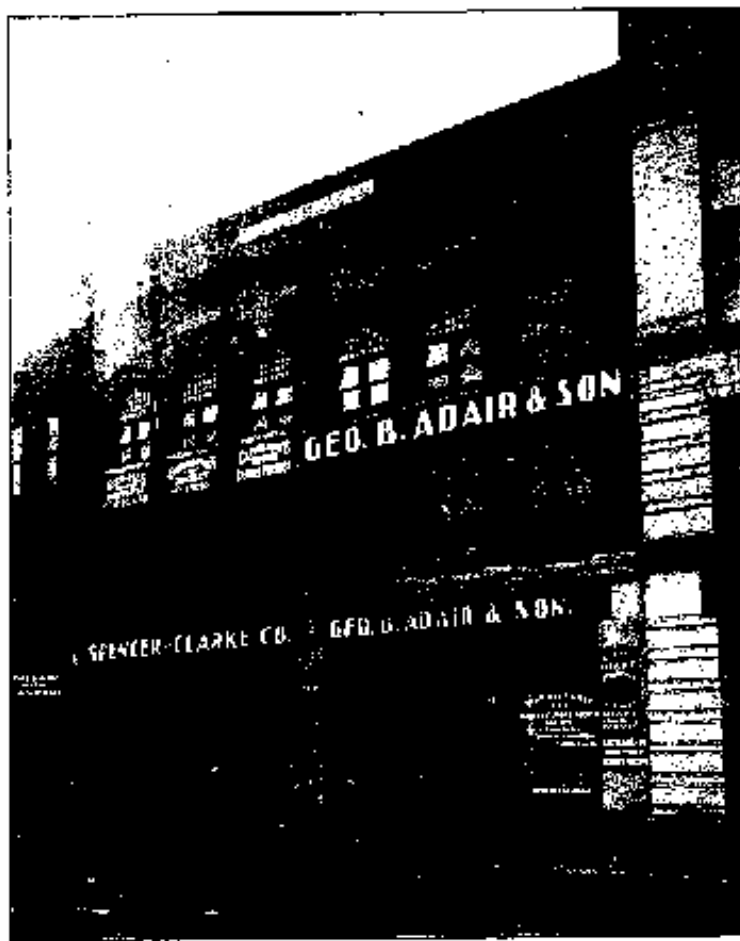


FIGURE 1: BUILDINGS OF SPENCER-CLARKE CO. AND GEO. B. ADAIR & SON.

Sound packed the following kinds of fish:

	Cases.
Sockeyes	528,000
Spring salmon	22,600
Oysters	103,500
Humpbacks	256,800
Chums	19,400

On the Columbia River the eighteen

766,000 cases, of which the forty-nine canneries on the Fraser river put up 628,000 cases, and the northern pack was 238,000 cases.

This shows the Puget sound canneries packed nearly double the amount of any other locality.

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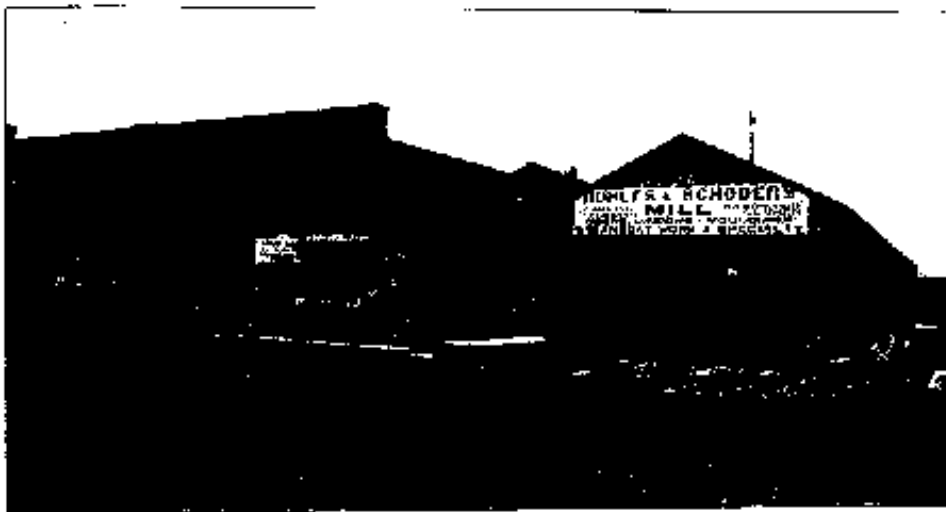
57

the busy places in the city. Eleven steamboats make a landing at this place, and have intercourse with all points on Puget Sound. About their wharf and in their warehouse they give steady employment to thirty people, and during the year they will probably increase this number, at least to the extent of putting representatives on the road to travel in their interest.

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