Machine Learning Model Attempts and Explanations

August 22, 2024

1 Machine Learning Model for Annulation Count

```python
[3]: import os
import cv2
import numpy as np
from sklearn.model_selection import train_test_split

directory = './Cementum Data with Counts Bad Images Removed/'

# Resize all images
target_size = (300, 300)

images = []
counts = []

for dirpath, dirnames, files in os.walk(directory):
    if not dirnames:
        cementum_counts = int(dirpath.split(" ")[-1])
        for file in files:
            path = os.path.join(dirpath, file)
            image = cv2.imread(path, cv2.IMREAD_COLOR)
            resized_image = cv2.resize(image, target_size)
            blurred_image = cv2.GaussianBlur(resized_image, (5, 5), 0)
            equalized_image = cv2.merge([
                cv2.equalizeHist(blurred_image[:, :, 0]),
                cv2.equalizeHist(blurred_image[:, :, 1]),
                cv2.equalizeHist(blurred_image[:, :, 2])
            ])

            images.append(resized_image)
            counts.append(cementum_counts)

X = np.array(images)
y = np.array(counts)
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
 ↪random_state=42)
```

```
print("Training set shape:", X_train.shape, y_train.shape)
print("Testing set shape:", X_test.shape, y_test.shape)
```

```
Training set shape: (768, 300, 300, 3) (768,)
Testing set shape: (193, 300, 300, 3) (193,)
```

1.1 Explanation

The above code just goes through the specified folder and opens the images using CV2 library for Python. I went through the folder and added cementum counts based on Akacia's spreadsheet to the folder names. Therefore, the code puts the images along with the cementum counts in two arrays, which are then passed into a train_test_split.

```python
[7]: import tensorflow as tf
     from tensorflow.keras.models import Sequential
     from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense

     model = Sequential([
         Conv2D(32, (3, 3), activation='relu', input_shape=(300, 300, 3)),
         MaxPooling2D((2, 2)),
         Conv2D(64, (3, 3), activation='relu'),
         MaxPooling2D((2, 2)),
         Flatten(),
         Dense(128, activation='relu'),
         Dense(1, activation='linear')
     ])

     model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mae'])

     model.fit(X_train, y_train, epochs=6, validation_split=0.2)

     test_loss, test_mae = model.evaluate(X_test, y_test)
     print("Test MAE:", test_mae)
```

```
Epoch 1/6
20/20              12s 569ms/step -
loss: 32132792.0000 - mae: 2802.3245 - val_loss: 2194.0579 - val_mae: 43.6548
Epoch 2/6
20/20              11s 566ms/step -
loss: 2786.8755 - mae: 44.5068 - val_loss: 470.1296 - val_mae: 17.3353
Epoch 3/6
20/20              11s 562ms/step -
loss: 408.6553 - mae: 16.1222 - val_loss: 230.4533 - val_mae: 12.3777
Epoch 4/6
20/20              12s 579ms/step -
loss: 226.4553 - mae: 12.2911 - val_loss: 196.7703 - val_mae: 11.7355
Epoch 5/6
20/20              11s 567ms/step -
loss: 184.8667 - mae: 10.9853 - val_loss: 210.1182 - val_mae: 11.9526
```

```
Epoch 6/6
20/20                    11s 564ms/step -
loss: 183.8877 - mae: 10.9530 - val_loss: 227.8824 - val_mae: 12.7923
7/7                 1s 112ms/step - loss:
277.1205 - mae: 13.8812
Test MAE: 13.423197746276855
```

The above code uses the Sequential model for Keras for our annulation estimation model. I chose it because it was straightforward and did not want to have any issues with overfitting, since the dataset has a large variety of quality.

For future development, one could consider trying different model architectures to see how it changes the accuracy of the estimates.

2   Notes

- Standardizing images to 300, 300 returns a Test MAE of 11.054 (not great)
- Using edge detection and 300, 300 returns a Test MAE of 11.071 (basically the same thing)

3   Using Data Augmentation

```python
[48]: import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense,
 ↪Dropout, BatchNormalization
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from sklearn.model_selection import train_test_split

datagen = ImageDataGenerator(
    rotation_range=20,
    width_shift_range=0.2,
    height_shift_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    brightness_range=[0.8, 1.2]
)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
 ↪random_state=42)

input_shape = (300, 300, 3)

model = Sequential([
    Conv2D(32, (3, 3), activation='relu', input_shape=input_shape),
    BatchNormalization(),
    MaxPooling2D((2, 2)),
    Dropout(0.25),
```

```python
    Conv2D(64, (3, 3), activation='relu'),
    BatchNormalization(),
    MaxPooling2D((2, 2)),
    Dropout(0.25),

    Conv2D(128, (3, 3), activation='relu'),
    BatchNormalization(),
    MaxPooling2D((2, 2)),
    Dropout(0.25),

    Flatten(),
    Dense(256, activation='relu'),
    BatchNormalization(),
    Dropout(0.5),

    Dense(1, activation='linear')
])

model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mae'])

model.fit(datagen.flow(X_train, y_train, batch_size=32), epochs=50,
    validation_data=(X_test, y_test))

test_loss, test_mae = model.evaluate(X_test, y_test)
print("Test MAE:", test_mae)
```

```
Epoch 1/50

/Users/sergioguerra/anaconda3/lib/python3.11/site-
packages/keras/src/trainers/data_adapters/py_dataset_adapter.py:121:
UserWarning: Your `PyDataset` class should call `super().__init__(**kwargs)` in
its constructor. `**kwargs` can include `workers`, `use_multiprocessing`,
`max_queue_size`. Do not pass these arguments to `fit()`, as they will be
ignored.
  self._warn_if_super_not_called()

31/31              50s 1s/step - loss:
1206.2736 - mae: 31.3695 - val_loss: 1249.1981 - val_mae: 32.0655
Epoch 2/50
31/31              48s 1s/step - loss:
1167.5787 - mae: 30.8453 - val_loss: 1403.8884 - val_mae: 34.4828
Epoch 3/50
31/31              47s 1s/step - loss:
1130.6686 - mae: 30.3678 - val_loss: 1073.3232 - val_mae: 29.4530
Epoch 4/50
31/31              46s 1s/step - loss:
1099.0664 - mae: 29.8599 - val_loss: 608.2206 - val_mae: 19.8704
Epoch 5/50
```

```
31/31              46s 1s/step - loss:
962.1870 - mae: 27.5318 - val_loss: 1240.6549 - val_mae: 31.9073
Epoch 6/50
31/31              46s 1s/step - loss:
895.2390 - mae: 26.3688 - val_loss: 761.4824 - val_mae: 24.0777
Epoch 7/50
31/31              46s 1s/step - loss:
753.2097 - mae: 23.9441 - val_loss: 595.3557 - val_mae: 20.6539
Epoch 8/50
31/31              46s 1s/step - loss:
676.9757 - mae: 22.3798 - val_loss: 487.5308 - val_mae: 18.4534
Epoch 9/50
31/31              47s 1s/step - loss:
537.9750 - mae: 19.3681 - val_loss: 572.0834 - val_mae: 20.4704
Epoch 10/50
31/31              46s 1s/step - loss:
390.5072 - mae: 15.6369 - val_loss: 334.5148 - val_mae: 14.5505
Epoch 11/50
31/31              47s 1s/step - loss:
326.8654 - mae: 14.4393 - val_loss: 13095.7178 - val_mae: 75.6161
Epoch 12/50
31/31              46s 1s/step - loss:
285.5826 - mae: 13.3566 - val_loss: 337.2475 - val_mae: 14.4164
Epoch 13/50
31/31              50s 2s/step - loss:
247.9810 - mae: 12.4381 - val_loss: 355.4486 - val_mae: 14.2383
Epoch 14/50
31/31              49s 1s/step - loss:
229.7250 - mae: 11.8402 - val_loss: 203.5960 - val_mae: 11.5270
Epoch 15/50
31/31              47s 1s/step - loss:
235.1915 - mae: 12.1523 - val_loss: 227.9884 - val_mae: 11.9643
Epoch 16/50
31/31              48s 1s/step - loss:
241.0960 - mae: 12.3501 - val_loss: 194.3649 - val_mae: 11.2198
Epoch 17/50
31/31              47s 1s/step - loss:
222.1981 - mae: 11.9842 - val_loss: 214.4880 - val_mae: 11.8777
Epoch 18/50
31/31              47s 1s/step - loss:
245.2272 - mae: 12.7425 - val_loss: 197.4191 - val_mae: 10.8785
Epoch 19/50
31/31              47s 1s/step - loss:
211.2990 - mae: 11.5146 - val_loss: 202.2999 - val_mae: 11.1312
Epoch 20/50
31/31              47s 1s/step - loss:
225.1016 - mae: 11.9648 - val_loss: 250.0578 - val_mae: 11.6570
Epoch 21/50
```

```
31/31              51s 2s/step – loss:
225.3214 – mae: 12.2064 – val_loss: 201.9349 – val_mae: 11.2443
Epoch 22/50
31/31              49s 1s/step – loss:
248.8160 – mae: 12.5663 – val_loss: 535.8649 – val_mae: 14.6773
Epoch 23/50
31/31              49s 1s/step – loss:
227.3924 – mae: 11.9950 – val_loss: 232.6961 – val_mae: 11.8131
Epoch 24/50
31/31              54s 2s/step – loss:
225.5574 – mae: 12.0113 – val_loss: 7531.4785 – val_mae: 44.9207
Epoch 25/50
31/31              48s 1s/step – loss:
224.5847 – mae: 12.0291 – val_loss: 97843.4844 – val_mae: 204.9100
Epoch 26/50
31/31              47s 1s/step – loss:
216.8975 – mae: 11.8908 – val_loss: 5610.7676 – val_mae: 43.0975
Epoch 27/50
31/31              46s 1s/step – loss:
222.3887 – mae: 11.8813 – val_loss: 447.1851 – val_mae: 12.0427
Epoch 28/50
31/31              46s 1s/step – loss:
227.3379 – mae: 12.2495 – val_loss: 2902.0364 – val_mae: 22.9181
Epoch 29/50
31/31              46s 1s/step – loss:
227.0835 – mae: 12.0516 – val_loss: 983.3303 – val_mae: 15.1907
Epoch 30/50
31/31              354s 12s/step –
loss: 223.0812 – mae: 11.7224 – val_loss: 713.8560 – val_mae: 13.8368
Epoch 31/50
31/31              54s 2s/step – loss:
218.4436 – mae: 11.6496 – val_loss: 438.8575 – val_mae: 12.0969
Epoch 32/50
31/31              46s 1s/step – loss:
203.4132 – mae: 11.2624 – val_loss: 283.2282 – val_mae: 11.4449
Epoch 33/50
31/31              45s 1s/step – loss:
213.0977 – mae: 11.5628 – val_loss: 997.7631 – val_mae: 14.5505
Epoch 34/50
31/31              46s 1s/step – loss:
225.1993 – mae: 11.6799 – val_loss: 194.4450 – val_mae: 10.8545
Epoch 35/50
31/31              45s 1s/step – loss:
195.4013 – mae: 11.2702 – val_loss: 223.3682 – val_mae: 11.4769
Epoch 36/50
31/31              45s 1s/step – loss:
211.9400 – mae: 11.5551 – val_loss: 415.5225 – val_mae: 12.2310
Epoch 37/50
```

```
31/31              46s 1s/step - loss:
197.4000 - mae: 11.2777 - val_loss: 613.7288 - val_mae: 12.4003
Epoch 38/50
31/31              45s 1s/step - loss:
207.7241 - mae: 11.4472 - val_loss: 190.7456 - val_mae: 10.8015
Epoch 39/50
31/31              46s 1s/step - loss:
207.4789 - mae: 11.4050 - val_loss: 178.3327 - val_mae: 10.4559
Epoch 40/50
31/31              48s 1s/step - loss:
205.5062 - mae: 11.2911 - val_loss: 324.1114 - val_mae: 12.2763
Epoch 41/50
31/31              47s 1s/step - loss:
200.2452 - mae: 11.3562 - val_loss: 502.2448 - val_mae: 12.6748
Epoch 42/50
31/31              47s 1s/step - loss:
201.9768 - mae: 11.1315 - val_loss: 185.7601 - val_mae: 10.6335
Epoch 43/50
31/31              47s 1s/step - loss:
212.7224 - mae: 11.8360 - val_loss: 919.7776 - val_mae: 17.1093
Epoch 44/50
31/31              46s 1s/step - loss:
240.5297 - mae: 12.4681 - val_loss: 84173.4453 - val_mae: 134.3714
Epoch 45/50
31/31              45s 1s/step - loss:
218.3740 - mae: 11.7230 - val_loss: 195.6646 - val_mae: 11.1087
Epoch 46/50
31/31              45s 1s/step - loss:
195.9594 - mae: 11.1154 - val_loss: 12764.2988 - val_mae: 39.3597
Epoch 47/50
31/31              45s 1s/step - loss:
202.7935 - mae: 11.1181 - val_loss: 152905.0469 - val_mae: 210.9663
Epoch 48/50
31/31              45s 1s/step - loss:
199.8618 - mae: 11.2997 - val_loss: 837.4425 - val_mae: 13.9979
Epoch 49/50
31/31              47s 1s/step - loss:
210.2700 - mae: 11.6403 - val_loss: 355.9082 - val_mae: 13.4164
Epoch 50/50
31/31              46s 1s/step - loss:
206.4306 - mae: 11.2614 - val_loss: 213.2663 - val_mae: 11.4781
8/8                2s 234ms/step - loss:
218.8380 - mae: 11.7822
Test MAE: 11.478052139282227
```

The above attempt used data augmentation to further change and add variety to the training data. The test was also ran for more epochs but that did not seem to have any great effect on the test MAE. It is also worth noting that this Sequential model has more layers and is more complex, but

that did not seem to have a great effect either.

4   Removing Slides that were Redone

```python
[52]: import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense,␣
 ↪Dropout, BatchNormalization
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from sklearn.model_selection import train_test_split

datagen = ImageDataGenerator(
    rotation_range=20,
    width_shift_range=0.2,
    height_shift_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    brightness_range=[0.8, 1.2]
)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
 ↪random_state=42)

input_shape = (300, 300, 3)

model = Sequential([
    Conv2D(32, (3, 3), activation='relu', input_shape=input_shape),
    BatchNormalization(),
    MaxPooling2D((2, 2)),
    Dropout(0.25),

    Conv2D(64, (3, 3), activation='relu'),
    BatchNormalization(),
    MaxPooling2D((2, 2)),
    Dropout(0.25),

    Conv2D(128, (3, 3), activation='relu'),
    BatchNormalization(),
    MaxPooling2D((2, 2)),
    Dropout(0.25),

    Flatten(),
    Dense(256, activation='relu'),
    BatchNormalization(),
    Dropout(0.5),
```

```python
    Dense(1, activation='linear')
])

model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mae'])

model.fit(datagen.flow(X_train, y_train, batch_size=32), epochs=50,
  ↪validation_data=(X_test, y_test))

test_loss, test_mae = model.evaluate(X_test, y_test)
print("Test MAE:", test_mae)
```

/Users/sergioguerra/anaconda3/lib/python3.11/site-
packages/keras/src/layers/convolutional/base_conv.py:107: UserWarning: Do not
pass an `input_shape`/`input_dim` argument to a layer. When using Sequential
models, prefer using an `Input(shape)` object as the first layer in the model
instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)

Epoch 1/50

/Users/sergioguerra/anaconda3/lib/python3.11/site-
packages/keras/src/trainers/data_adapters/py_dataset_adapter.py:121:
UserWarning: Your `PyDataset` class should call `super().__init__(**kwargs)` in
its constructor. `**kwargs` can include `workers`, `use_multiprocessing`,
`max_queue_size`. Do not pass these arguments to `fit()`, as they will be
ignored.
  self._warn_if_super_not_called()

24/24   40s 1s/step - loss:
1286.8789 - mae: 33.0725 - val_loss: 590.4973 - val_mae: 19.7711
Epoch 2/50
24/24   38s 1s/step - loss:
1319.6798 - mae: 33.4466 - val_loss: 677.5323 - val_mae: 22.4370
Epoch 3/50
24/24   39s 2s/step - loss:
1288.8495 - mae: 33.3363 - val_loss: 1089.0237 - val_mae: 30.1252
Epoch 4/50
24/24   37s 1s/step - loss:
1255.0658 - mae: 32.8908 - val_loss: 736.2646 - val_mae: 23.3693
Epoch 5/50
24/24   36s 1s/step - loss:
1167.0338 - mae: 31.5517 - val_loss: 1060.1381 - val_mae: 29.5870
Epoch 6/50
24/24   36s 1s/step - loss:
1086.8112 - mae: 30.3331 - val_loss: 932.6024 - val_mae: 27.5142
Epoch 7/50
24/24   36s 1s/step - loss:
1001.2469 - mae: 28.9120 - val_loss: 1015.9105 - val_mae: 28.9452
Epoch 8/50
```

```
24/24              36s 1s/step - loss:
942.1511 - mae: 27.7600 - val_loss: 537.2030 - val_mae: 19.2075
Epoch 9/50
24/24              36s 1s/step - loss:
865.1268 - mae: 26.4493 - val_loss: 923.1017 - val_mae: 27.1582
Epoch 10/50
24/24              36s 1s/step - loss:
720.9659 - mae: 23.4617 - val_loss: 681.8240 - val_mae: 22.6475
Epoch 11/50
24/24              36s 1s/step - loss:
632.2966 - mae: 21.6925 - val_loss: 458.3267 - val_mae: 17.6039
Epoch 12/50
24/24              36s 1s/step - loss:
497.7816 - mae: 18.4711 - val_loss: 630.0406 - val_mae: 21.6120
Epoch 13/50
24/24              37s 1s/step - loss:
454.3116 - mae: 17.7977 - val_loss: 590.7770 - val_mae: 20.4671
Epoch 14/50
24/24              36s 1s/step - loss:
354.4001 - mae: 15.2543 - val_loss: 238.9982 - val_mae: 12.0149
Epoch 15/50
24/24              36s 1s/step - loss:
268.1935 - mae: 13.1958 - val_loss: 288.7576 - val_mae: 13.2382
Epoch 16/50
24/24              37s 1s/step - loss:
267.9977 - mae: 13.0274 - val_loss: 204.8908 - val_mae: 11.4626
Epoch 17/50
24/24              37s 1s/step - loss:
206.8232 - mae: 11.3872 - val_loss: 212.8953 - val_mae: 11.5324
Epoch 18/50
24/24              36s 1s/step - loss:
199.1107 - mae: 11.0436 - val_loss: 280.5509 - val_mae: 13.4124
Epoch 19/50
24/24              37s 1s/step - loss:
182.9895 - mae: 10.6848 - val_loss: 214.4108 - val_mae: 11.5702
Epoch 20/50
24/24              37s 1s/step - loss:
188.3889 - mae: 10.7805 - val_loss: 198.6457 - val_mae: 11.3648
Epoch 21/50
24/24              36s 1s/step - loss:
178.8017 - mae: 10.6363 - val_loss: 387.1995 - val_mae: 14.2193
Epoch 22/50
24/24              36s 1s/step - loss:
183.3302 - mae: 10.9258 - val_loss: 296.7505 - val_mae: 13.6518
Epoch 23/50
24/24              36s 1s/step - loss:
167.3358 - mae: 10.4476 - val_loss: 209.3198 - val_mae: 11.5315
Epoch 24/50
```

24/24   **36s** 1s/step - loss:
168.1707 - mae: 10.2827 - val_loss: 200.7135 - val_mae: 11.2787
Epoch 25/50
24/24   **36s** 1s/step - loss:
178.1377 - mae: 10.4215 - val_loss: 341.8189 - val_mae: 14.5295
Epoch 26/50
24/24   **37s** 1s/step - loss:
170.2064 - mae: 10.6295 - val_loss: 216.6803 - val_mae: 11.3793
Epoch 27/50
24/24   **36s** 1s/step - loss:
165.4712 - mae: 10.2665 - val_loss: 261.1731 - val_mae: 12.7194
Epoch 28/50
24/24   **42s** 2s/step - loss:
179.6990 - mae: 10.3815 - val_loss: 320.2280 - val_mae: 13.5728
Epoch 29/50
24/24   **42s** 2s/step - loss:
181.0420 - mae: 10.6316 - val_loss: 264.3726 - val_mae: 12.2562
Epoch 30/50
24/24   **41s** 2s/step - loss:
153.6335 - mae: 9.8775 - val_loss: 193.9030 - val_mae: 11.0606
Epoch 31/50
24/24   **36s** 1s/step - loss:
176.0122 - mae: 10.5607 - val_loss: 189.6879 - val_mae: 11.2502
Epoch 32/50
24/24   **36s** 1s/step - loss:
166.5701 - mae: 10.3708 - val_loss: 200.8156 - val_mae: 11.2749
Epoch 33/50
24/24   **36s** 1s/step - loss:
164.3159 - mae: 10.2990 - val_loss: 227.2190 - val_mae: 12.6133
Epoch 34/50
24/24   **36s** 1s/step - loss:
190.3711 - mae: 10.8127 - val_loss: 278.9263 - val_mae: 13.4597
Epoch 35/50
24/24   **36s** 1s/step - loss:
156.8288 - mae: 9.7897 - val_loss: 269.4252 - val_mae: 13.5957
Epoch 36/50
24/24   **36s** 1s/step - loss:
149.4976 - mae: 9.8569 - val_loss: 182.0719 - val_mae: 10.9639
Epoch 37/50
24/24   **36s** 1s/step - loss:
172.3052 - mae: 10.2263 - val_loss: 193.1353 - val_mae: 10.9673
Epoch 38/50
24/24   **38s** 1s/step - loss:
164.7515 - mae: 10.2500 - val_loss: 177.5056 - val_mae: 10.5695
Epoch 39/50
24/24   **40s** 2s/step - loss:
164.0753 - mae: 10.2688 - val_loss: 188.0738 - val_mae: 10.8811
Epoch 40/50

```
24/24              37s 1s/step - loss:
171.3096 - mae: 10.5557 - val_loss: 276.2413 - val_mae: 13.3607
Epoch 41/50
24/24              36s 1s/step - loss:
168.3241 - mae: 10.5085 - val_loss: 214.4678 - val_mae: 12.0680
Epoch 42/50
24/24              37s 1s/step - loss:
171.2304 - mae: 10.2788 - val_loss: 239.8869 - val_mae: 12.2356
Epoch 43/50
24/24              36s 1s/step - loss:
181.5870 - mae: 10.5368 - val_loss: 205.8500 - val_mae: 11.6421
Epoch 44/50
24/24              36s 1s/step - loss:
154.3173 - mae: 9.9175 - val_loss: 195.2650 - val_mae: 10.8695
Epoch 45/50
24/24              36s 1s/step - loss:
156.6305 - mae: 9.9547 - val_loss: 237.4667 - val_mae: 11.9588
Epoch 46/50
24/24              36s 1s/step - loss:
167.0699 - mae: 10.2162 - val_loss: 219.1705 - val_mae: 12.3070
Epoch 47/50
24/24              36s 1s/step - loss:
165.4396 - mae: 10.2430 - val_loss: 193.8152 - val_mae: 11.0766
Epoch 48/50
24/24              36s 1s/step - loss:
161.2307 - mae: 10.0850 - val_loss: 214.4054 - val_mae: 11.9466
Epoch 49/50
24/24              36s 1s/step - loss:
174.6869 - mae: 10.5281 - val_loss: 188.0197 - val_mae: 10.9759
Epoch 50/50
24/24              37s 1s/step - loss:
142.9680 - mae: 9.3978 - val_loss: 209.6906 - val_mae: 11.2341
7/7              1s 190ms/step - loss:
215.0089 - mae: 11.6139
Test MAE: 11.234148979187012
```

This attempt only uses training data which was redone and I removed slides that were redone. It still uses a complex model which can be summarized with the following:

Convolutional Layers (Conv2D): Extract features from the images by a convolutional operation to an input image.

BatchNormalization Layers: Normalizing the layers' inputs by recentering and rescaling in order to increase stability and speed.

MaxPooling2D Layers: Reduce the spatial dimensions by selecting the maximum value in each region which retains the most important information.

Dropout Layers: Prevent overfitting by randomly dropping units during training.

Flatten Layer: Convert 2D feature maps into a 1D vector for the dense layers.

Dense Layers: Make predictions based on the extracted features. In our case, this would be the annulation estimation.

5 Using RoboFlow

```python
from roboflow import Roboflow
import os

rf = Roboflow(api_key="your key")
project = rf.workspace().project("annulation-region-detection")
model = project.version(1).model

count = 0
directory = "./Flattened Images with Only Redone (RoboFlow)/"

for dirpath, dirnames, files in os.walk(directory):
    for file in files:
        if file.lower().endswith(('.png', '.jpg', '.jpeg')):
            path = os.path.join(dirpath, file)
            new_file = "prediction-" + file
            prediction = model.predict(path, confidence=90).json()
            prediction_array = prediction['predictions']
            if len(prediction_array) != 0:
                if prediction_array[0]['confidence'] > 0.90:
                    model.predict(path, confidence=90).save(os.path.join("./
 ↪RoboFlow Predictions - 80 percent confident/", new_file))
                    count += 1
                    print("Processed (" + str(count) + "): " + file)
```

```
loading Roboflow workspace…
loading Roboflow project…
Processed (1): PNRP14_B.5.34_SKULL9_T46_SLIDE3_PIC1.jpg
Processed (2): PNRP14_B.7.19.56_T195_SLIDE1_PIC2.jpg
Processed (3): PNRP12_B.6.5.18_T189_SLIDE4_PIC4.jpg
Processed (4): PNRP12_B.4.22_T10_2_SLIDE6_PIC1.jpg
Processed (5): PNRP12_B.4.17_T6_SLIDE3_PIC3.jpg
Processed (6): PNRP14_B.7.33_T232_SLIDE4_PIC1.jpg
Processed (7): PNRP12_B.4.10_T2_SLIDE3_PIC2.jpg
Processed (8): PNRP14_B.7.33_T274_SLIDE2_PIC1.jpg
Processed (9): PNRP14_B.6.32_T142_SLIDE3_PIC1.jpg
Processed (10): PNRP12_B.4.22_T10_SLIDE7_PIC5.jpg
Processed (11): PNRP12_B.4.22_T10_SLIDE7_PIC4.jpg
Processed (12): PNRP12_B.5.15_T267_SLIDE2_PIC3.jpg
Processed (13): PNRP12_B.4.22_T10_SLIDE6_PIC4.jpg
Processed (14): PNRP12_B.4.10_T1_SLIDE1_PIC1.jpg
Processed (15): PNRP12_B.4.10_T2_SLIDE3_PIC3.jpg
Processed (16): PNRP14_B.5.35.17_T72_SLIDE2_PIC1.jpg
```

```
Processed (17): PNRP12_B.4.17_T6_SLIDE2_PIC2.jpg
Processed (18): PNRP14_B.7.19.56_T195_SLIDE1_PIC3.jpg
Processed (19): PNRP12_B.4.22_T10_SLIDE2_PIC10.jpg
Processed (20): PNRP14_B.5.35_T93_SLIDE6_PIC1.jpg
Processed (21): PNRP14_B.6.36_T144_SLIDE3_PIC2.jpg
Processed (22): PNRP14_B.7.19.56_T195_SLIDE1_PIC1.jpg
Processed (23): PNRP14_B.7.19.56_T199_SLIDE2_PIC1.jpg
Processed (24): PNRP14_B.7.33_T232_SLIDE5_PIC2.jpg
Processed (25): PNRP14_B.7.19.56_T199_SLIDE3_PIC1.jpg
Processed (26): PNRP14_B.6.44_T165_SLIDE5_PIC9.jpg
Processed (27): PNRP14_B.7.33_T274_SLIDE3_PIC2.jpg
Processed (28): PNRP14_B.7.33_T274_SLIDE2_PIC2.jpg
Processed (29): PNRP12_B.4.22_T10_SLIDE7_PIC6.jpg
Processed (30): PNRP12_B.4.22_T10_SLIDE6_PIC6.jpg
Processed (31): PNRP12_B.5.15_T267_SLIDE2_PIC1.jpg
Processed (32): PNRP12_B.4.22_T10_SLIDE7_PIC7.jpg
Processed (33): PNRP12_B.4.10_T1_SLIDE1_PIC2.jpg
Processed (34): PNRP14_B.7.33_T232_SLIDE4_PIC3.jpg
Processed (35): PNRP14_B.7.33_T232_SLIDE5_PIC3.jpg
Processed (36): PNRP12_B.4.22_T10_2_SLIDE6_PIC3.jpg
Processed (37): PNRP14_B.5.35.17_T72_SLIDE3_PIC2.jpg
Processed (38): PNRP12_B.4.17_T6_SLIDE3_PIC1.jpg
Processed (39): PNRP14_B.5.35.17_T72_SLIDE2_PIC2.jpg
Processed (40): PNRP14_B.6.36_T144_SLIDE3_PIC3.jpg
Processed (41): PNRP14_B.6.36_T144_SLIDE2_PIC3.jpg
Processed (42): TOMB2_COMMINGLED_T250_SLIDE3_PIC2.jpg
Processed (43): PNRP14_B.7.33_T234_SLIDE2_PIC3.jpg
Processed (44): PNRP12_B.4.22_T10_SLIDE2_PIC9.jpg
Processed (45): PNRP12_B.6.5.18_T189_SLIDE5_PIC2.jpg
Processed (46): PNRP12_B.6.5.18_T189_SLIDE4_PIC2.jpg
Processed (47): PNRP12_B.4.22_T10_SLIDE7_PIC3.jpg
Processed (48): PNRP12_B.4.22_T10_SLIDE6_PIC3.jpg
Processed (49): PNRP12_B.4.22_T10_SLIDE7_PIC2.jpg
Processed (50): PNRP12_B.6.5.18_T189_SLIDE4_PIC3.jpg
Processed (51): PNRP12_B.6.5.18_T189_SLIDE5_PIC3.jpg
Processed (52): PNRP12_B.4.22_T10_SLIDE2_PIC8.jpg
Processed (53): PNRP14_B.7.19.56_T192_SLIDE1_PIC1.jpg
Processed (54): PNRP14_B.5.33_T39_SLIDE4_PIC1.jpg
Processed (55): PNRP14_B.7.33_T234_SLIDE3_PIC2.jpg
Processed (56): PNRP12_B.4.23_T12_SLIDE8_PIC2.jpg
Processed (57): TOMB2_COMMINGLED_T250_SLIDE2_PIC3.jpg
Processed (58): PNRP14_B.7.33_T237_SLIDE1_PIC2.jpg
Processed (59): PNRP14_B.7.19.56_T192_SLIDE1_PIC3.jpg
Processed (60): PNRP12_B.5.15_T263_SLIDE1_PIC1.jpg
Processed (61): PNRP14_B.7.33_T232_SLIDE5_PIC4.jpg
Processed (62): PNRP12_B.6.5.18_T189_SLIDE4_PIC1.jpg
Processed (63): PNRP12_B.6.5.18_T189_SLIDE5_PIC1.jpg
Processed (64): PNRP14_B.7.33_T274_SLIDE3_PIC4.jpg
```

```
Processed (65): PNRP14_B.6.31_T140_SLIDE3_PIC1.jpg
Processed (66): PNRP16_F.1.28.97.69_T312_SLIDE2_PIC2.jpg
Processed (67): PNRP12_B.4.22_T10_SLIDE7_PIC1.jpg
Processed (68): PNRP12_B.4.22_T10_SLIDE6_PIC1.jpg
Processed (69): PNRP14_B.7.19.56_T192_SLIDE1_PIC2.jpg
Processed (70): PNRP14_B.6.43_T151_SLIDE4_PIC1.jpg
Processed (71): PNRP14_B.5.35_T99_SLIDE3_PIC2.jpg
Processed (72): PNRP14_B.6.6_T184_SLIDE3_PIC2.jpg
Processed (73): PNRP14_B.5.35_T77_SLIDE4_PIC2.jpg
Processed (74): PNRP14_B.7.33_T228_SLIDE1_PIC4.jpg
Processed (75): PNRP14_B.7.19.56_T194_SLIDE1_PIC4.jpg
Processed (76): PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC1.jpg
Processed (77): PNRP12_B.4.17_T6_SLIDE4_PIC4.jpg
Processed (78): PNRP12_B.4.23_T12_SLIDE5_PIC1.jpg
Processed (79): TOMB2_COMMINGLED_T251_SLIDE3_PIC3.jpg
Processed (80): TOMB2_BURIAL6_T258_SLIDE5_PIC1.jpg
Processed (81): PNRP14_B.6.43_T151_SLIDE2_PIC2.jpg
Processed (82): PNRP14_B.5.34_T51_SLIDE1_PIC1.jpg
Processed (83): PNRP14_B.5.33_T39_SLIDE3_PIC1.jpg
Processed (84): PNRP14_B.5.35_T97_SLIDE2_PIC3.jpg
Processed (85): PNRP14_B.5.33_T39_SLIDE3_PIC3.jpg
Processed (86): PNRP14_B.7.33_T274_SLIDE4_PIC4.jpg
Processed (87): PNRP16_F.1.28.97.69_T312_SLIDE4_PIC2.jpg
Processed (88): PNRP14_B.7.33_T232_SLIDE2_PIC4.jpg
Processed (89): PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC3.jpg
Processed (90): PNRP16_F.1.28.97.69_T312_SLIDE4_PIC3.jpg
Processed (91): TOMB2_BURIAL6_T258_SLIDE5_PIC2.jpg
Processed (92): PNRP12_B.4.22_T11_SLIDE6_PIC1.jpg
Processed (93): PNRP14_B.5.33_T39_SLIDE3_PIC2.jpg
Processed (94): PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC1.jpg
Processed (95): PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC1.jpg
Processed (96): PNRP14_B.5.35_T97_SLIDE2_PIC4.jpg
Processed (97): PNRP14_B.5.15_T22_SLIDE5_PIC3.jpg
Processed (98): PNRP14_B.5.35_T109_SLIDE2_PIC1.jpg
Processed (99): PNRP14_B.5.35_T109_SLIDE3_PIC1.jpg
Processed (100): PNRP14_B.6.36_T144_SLIDE4_PIC1.jpg
Processed (101): PNRP12_B.4.17_T8_SLIDE2_PIC1.jpg
Processed (102): PNRP14_B.7.33_T228_SLIDE1_PIC2.jpg
Processed (103): PNRP12_B.6.5.18_T189_SLIDE2_PIC4.jpg
Processed (104): PNRP12_B.4.17_T6_SLIDE4_PIC3.jpg
Processed (105): PNRP14_B.7.33_T232_SLIDE2_PIC1.jpg
Processed (106): PNRP14_B.7.19.56_T194_SLIDE1_PIC3.jpg
Processed (107): PNRP12_B.5.15_T267_SLIDE4_PIC3.jpg
Processed (108): PNRP14_B.7.34_T247_SLIDE1_PIC1.jpg
Processed (109): PNRP12_B.4.22_T10_SLIDE5_PIC11.jpg
Processed (110): PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC2.jpg
Processed (111): PNRP14_B.5.35_T109_SLIDE3_PIC2.jpg
Processed (112): PNRP14_B.6.44_T154_SLIDE4_PIC3.jpg
```

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Processed (113): PNRP14_B.6.36_T144_SLIDE4_PIC2.jpg
Processed (114): PNRP12_B.5.15_T266_SLIDE3_PIC1.jpg
Processed (115): PNRP12_B.5.15_T266_SLIDE2_PIC1.jpg
Processed (116): PNRP12_B.4.17_T8_SLIDE2_PIC2.jpg
Processed (117): PNRP12_B.4.17_T8_SLIDE3_PIC2.jpg
Processed (118): PNRP14_B.7.33_T274_SLIDE4_PIC2.jpg
Processed (119): PNRP12_B.5.15_T267_SLIDE4_PIC1.jpg
Processed (120): PNRP16_F.1.28.97.69_T312_SLIDE4_PIC4.jpg
Processed (121): PNRP14_B.7.19.56_T199_SLIDE5_PIC1.jpg
Processed (122): PNRP14_B.7.33_T232_SLIDE2_PIC2.jpg
Processed (123): PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC2.jpg
Processed (124): PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC5.jpg
Processed (125): PNRP12_B.4.10_T2_SLIDE5_PIC1.jpg
Processed (126): PNRP14_B.7.33_T232_SLIDE2_PIC3.jpg
Processed (127): PNRP16_F.1.28.97.69_T312_SLIDE4_PIC5.jpg
Processed (128): PNRP14_B.7.33_T274_SLIDE4_PIC3.jpg
Processed (129): PNRP12_B.4.23_T12_SLIDE5_PIC4.jpg
Processed (130): PNRP12_B.4.17_T8_SLIDE3_PIC3.jpg
Processed (131): PNRP14_B.5.15_T22_SLIDE5_PIC1.jpg
Processed (132): PNRP12_B.4.22_T10_SLIDE5_PIC12.jpg
Processed (133): PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC3.jpg
Processed (134): PNRP14_B.7.33_T237_SLIDE3_PIC2.jpg
Processed (135): PNRP12_B.6.10.35_T135_SLIDE4_PIC3.jpg
Processed (136): PNRP12_B.4.17_T282_SLIDE2_PIC2.jpg
Processed (137): PNRP14_B.7.19.56_T192_SLIDE3_PIC3.jpg
Processed (138): PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC2.jpg
Processed (139): PNRP14_B.6.38_T275_SLIDE3_PIC3.jpg
Processed (140): PNRP16_F.1.28.97.69_T312_SLIDE2_1.jpg
Processed (141): PNRP12_B.5.15_T262_SLIDE4_PIC1.jpg
Processed (142): PNRP14_B.6.37_T147_SLIDE4_PIC3.jpg
Processed (143): PNRP14_B.7.31_T222_SLIDE2_PIC1.jpg
Processed (144): PNRP12_B.4.10_T1_SLIDE3_PIC4.jpg
Processed (145): PNRP12_B.4.22_T10_SLIDE4_PIC1.jpg
Processed (146): PNRP16_F.1.28.97.69_T312_SLIDE1_PIC3.jpg
Processed (147): PNRP14_B.7.33_T232_SLIDE6_PIC5.jpg
Processed (148): PNRP14_B.7.33_T234_SLIDE1_PIC1.jpg
Processed (149): PNRP14_B.6.38_T275_SLIDE2_PIC2.jpg
```

```
---------------------------------------------------------------------------
HTTPError                                 Traceback (most recent call last)
Cell In[29], line 20
     18 if len(prediction_array) != 0:
     19     if prediction_array[0]['confidence'] > 0.90:
---> 20         model.predict(path, confidence=90).save(os.path.join("./RoboFlo ⌋
  ↪Predictions - 80 percent confident/", new_file))
     21         count += 1
     22         print("Processed (" + str(count) + "): " + file)
```

```
File ~/anaconda3/lib/python3.11/site-packages/roboflow/models/
 ↪instance_segmentation.py:60, in InstanceSegmentationModel.predict(self,␣
 ↪image_path, confidence)
     38 def predict(self, image_path, confidence=40):  # type: ignore[override]
     39     """
     40     Infers detections based on image from a specified model and image␣
 ↪path.
     41
   (…)
     58         >>> prediction = model.predict("YOUR_IMAGE.jpg")
     59     """   # noqa: E501
---> 60     return super().predict(
     61         image_path,
     62         confidence=confidence,
     63         prediction_type=INSTANCE_SEGMENTATION_MODEL,
     64     )


File ~/anaconda3/lib/python3.11/site-packages/roboflow/models/inference.py:126,␣
 ↪in InferenceModel.predict(self, image_path, prediction_type, **kwargs)
    124 url = f"{self.api_url}?{urllib.parse.urlencode(params)}"  # type:␣
 ↪ignore[attr-defined]
    125 response = requests.post(url, **request_kwargs)
--> 126 response.raise_for_status()
    128 return PredictionGroup.create_prediction_group(
    129     response.json(),
    130     image_path=image_path,
   (…)
    133     colors=self.colors,
    134 )


File ~/anaconda3/lib/python3.11/site-packages/requests/models.py:1021, in␣
 ↪Response.raise_for_status(self)
   1016     http_error_msg = (
   1017         f"{self.status_code} Server Error: {reason} for url: {self.url}"
   1018     )
   1020 if http_error_msg:
-> 1021     raise HTTPError(http_error_msg, response=self)

HTTPError: 403 Client Error: Forbidden for url: https://outline.roboflow.com/
 ↪annulation-region-detection/1?api_key=LuhaB9DHav8NHDPKM8Si&confidence=90
```

6 Self Hosted Inference - Annotates images

```python
import os
import supervision as sv
from inference import get_model
from PIL import Image
import json


model = get_model(model_id="annulation-region-detection/1", api_key="your key")

directory = "./Flattened Images with Only Redone (RoboFlow)/"

polygon_annotator = sv.PolygonAnnotator()

count = 0

for dirpath, dirnames, files in os.walk(directory):
    for file in files:
        if file.lower().endswith(('.png', '.jpg', '.jpeg')):
            path = os.path.join(dirpath, file)
            image = Image.open(path)
            new_file = "prediction-" + file
            results = model.infer(image=path)[0]
            predictions_json = results.json()

            predictions = json.loads(predictions_json)["predictions"]
            detections = sv.Detections.from_inference(results)

            confidence_threshold = 0.9

            if len(predictions) > 0 and predictions[0]["confidence"] >␣
  ↪confidence_threshold:
                # annotate image with polygon
                annotated_image = polygon_annotator.annotate(scene=image.
  ↪copy(), detections=detections)
                annotated_image.save(os.path.join("./Self-Hosted Inference - 90␣
  ↪percent confident/", new_file))
                count += 1
                print("Processed (" + str(count) + ") - " + file)
```

```
Processed (1) - PNRP14_B.5.34_SKULL9_T46_SLIDE3_PIC1.jpg
Processed (2) - PNRP14_B.7.19.56_T195_SLIDE1_PIC2.jpg
Processed (3) - PNRP12_B.6.5.18_T189_SLIDE4_PIC4.jpg
Processed (4) - PNRP12_B.4.22_T10_2_SLIDE6_PIC1.jpg
Processed (5) - PNRP12_B.4.17_T6_SLIDE3_PIC3.jpg
Processed (6) - PNRP14_B.7.33_T232_SLIDE4_PIC1.jpg
```

```
Processed (7) - PNRP12_B.4.10_T2_SLIDE3_PIC2.jpg
Processed (8) - PNRP14_B.7.33_T274_SLIDE2_PIC1.jpg
Processed (9) - PNRP14_B.6.32_T142_SLIDE3_PIC1.jpg
Processed (10) - PNRP12_B.4.22_T10_SLIDE7_PIC5.jpg
Processed (11) - PNRP12_B.4.22_T10_SLIDE7_PIC4.jpg
Processed (12) - PNRP12_B.5.15_T267_SLIDE2_PIC3.jpg
Processed (13) - PNRP12_B.4.22_T10_SLIDE6_PIC4.jpg
Processed (14) - PNRP12_B.4.10_T1_SLIDE1_PIC1.jpg
Processed (15) - PNRP12_B.4.10_T2_SLIDE3_PIC3.jpg
Processed (16) - PNRP14_B.5.35.17_T72_SLIDE2_PIC1.jpg
Processed (17) - PNRP14_B.7.19.56_T195_SLIDE1_PIC3.jpg
Processed (18) - PNRP12_B.4.22_T10_SLIDE2_PIC10.jpg
Processed (19) - PNRP14_B.5.35_T93_SLIDE6_PIC1.jpg
Processed (20) - PNRP14_B.6.36_T144_SLIDE3_PIC2.jpg
Processed (21) - PNRP14_B.7.19.56_T195_SLIDE1_PIC1.jpg
Processed (22) - PNRP14_B.7.19.56_T199_SLIDE2_PIC1.jpg
Processed (23) - PNRP14_B.7.33_T232_SLIDE5_PIC2.jpg
Processed (24) - PNRP14_B.7.19.56_T199_SLIDE3_PIC1.jpg
Processed (25) - PNRP14_B.6.44_T165_SLIDE5_PIC9.jpg
Processed (26) - PNRP14_B.7.33_T274_SLIDE3_PIC2.jpg
Processed (27) - PNRP14_B.7.33_T274_SLIDE2_PIC2.jpg
Processed (28) - PNRP12_B.4.22_T10_SLIDE7_PIC6.jpg
Processed (29) - PNRP12_B.4.22_T10_SLIDE6_PIC6.jpg
Processed (30) - PNRP12_B.5.15_T267_SLIDE2_PIC1.jpg
Processed (31) - PNRP12_B.4.22_T10_SLIDE7_PIC7.jpg
Processed (32) - PNRP12_B.4.10_T1_SLIDE1_PIC2.jpg
Processed (33) - PNRP14_B.7.33_T232_SLIDE4_PIC3.jpg
Processed (34) - PNRP14_B.7.33_T232_SLIDE5_PIC3.jpg
Processed (35) - PNRP12_B.4.22_T10_2_SLIDE6_PIC3.jpg
Processed (36) - PNRP14_B.5.35.17_T72_SLIDE3_PIC2.jpg
Processed (37) - PNRP12_B.4.17_T6_SLIDE3_PIC1.jpg
Processed (38) - PNRP14_B.5.35.17_T72_SLIDE2_PIC2.jpg
Processed (39) - PNRP14_B.6.36_T144_SLIDE3_PIC3.jpg
Processed (40) - PNRP14_B.6.36_T144_SLIDE2_PIC3.jpg
Processed (41) - TOMB2_COMMINGLED_T250_SLIDE3_PIC2.jpg
Processed (42) - PNRP14_B.7.33_T234_SLIDE2_PIC3.jpg
Processed (43) - PNRP12_B.4.22_T10_SLIDE2_PIC9.jpg
Processed (44) - PNRP12_B.6.5.18_T189_SLIDE5_PIC2.jpg
Processed (45) - PNRP12_B.6.5.18_T189_SLIDE4_PIC2.jpg
Processed (46) - PNRP12_B.4.22_T10_SLIDE7_PIC3.jpg
Processed (47) - PNRP12_B.4.22_T10_SLIDE6_PIC3.jpg
Processed (48) - PNRP12_B.4.22_T10_SLIDE7_PIC2.jpg
Processed (49) - PNRP12_B.6.5.18_T189_SLIDE4_PIC3.jpg
Processed (50) - PNRP12_B.6.5.18_T189_SLIDE5_PIC3.jpg
Processed (51) - PNRP12_B.4.22_T10_SLIDE2_PIC8.jpg
Processed (52) - PNRP14_B.7.19.56_T192_SLIDE1_PIC1.jpg
Processed (53) - PNRP14_B.5.33_T39_SLIDE4_PIC1.jpg
Processed (54) - PNRP14_B.7.33_T234_SLIDE3_PIC2.jpg
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Processed (55) - PNRP12_B.4.23_T12_SLIDE8_PIC2.jpg
Processed (56) - TOMB2_COMMINGLED_T250_SLIDE2_PIC3.jpg
Processed (57) - PNRP14_B.7.33_T237_SLIDE1_PIC2.jpg
Processed (58) - PNRP14_B.7.19.56_T192_SLIDE1_PIC3.jpg
Processed (59) - PNRP12_B.5.15_T263_SLIDE1_PIC1.jpg
Processed (60) - PNRP14_B.7.33_T232_SLIDE5_PIC4.jpg
Processed (61) - PNRP12_B.6.5.18_T189_SLIDE4_PIC1.jpg
Processed (62) - PNRP12_B.6.5.18_T189_SLIDE5_PIC1.jpg
Processed (63) - PNRP14_B.7.33_T274_SLIDE3_PIC4.jpg
Processed (64) - PNRP14_B.6.31_T140_SLIDE3_PIC1.jpg
Processed (65) - PNRP16_F.1.28.97.69_T312_SLIDE2_PIC2.jpg
Processed (66) - PNRP12_B.4.22_T10_SLIDE7_PIC1.jpg
Processed (67) - PNRP12_B.4.22_T10_SLIDE6_PIC1.jpg
Processed (68) - PNRP14_B.7.19.56_T192_SLIDE1_PIC2.jpg
Processed (69) - PNRP14_B.6.43_T151_SLIDE4_PIC1.jpg
Processed (70) - PNRP14_B.5.35_T99_SLIDE3_PIC2.jpg
Processed (71) - PNRP14_B.6.6_T184_SLIDE3_PIC2.jpg
Processed (72) - PNRP14_B.5.35_T77_SLIDE4_PIC2.jpg
Processed (73) - PNRP14_B.7.33_T228_SLIDE1_PIC4.jpg
Processed (74) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC1.jpg
Processed (75) - PNRP14_B.7.19.56_T194_SLIDE1_PIC4.jpg
Processed (76) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC1.jpg
Processed (77) - PNRP12_B.4.17_T6_SLIDE4_PIC4.jpg
Processed (78) - PNRP12_B.4.23_T12_SLIDE5_PIC1.jpg
Processed (79) - TOMB2_COMMINGLED_T251_SLIDE3_PIC3.jpg
Processed (80) - TOMB2_BURIAL6_T258_SLIDE5_PIC1.jpg
Processed (81) - PNRP14_B.6.43_T151_SLIDE2_PIC2.jpg
Processed (82) - PNRP14_B.5.34_T51_SLIDE1_PIC1.jpg
Processed (83) - PNRP14_B.5.33_T39_SLIDE3_PIC1.jpg
Processed (84) - PNRP14_B.5.35_T97_SLIDE2_PIC3.jpg
Processed (85) - PNRP14_B.5.33_T39_SLIDE3_PIC3.jpg
Processed (86) - PNRP14_B.7.33_T274_SLIDE4_PIC4.jpg
Processed (87) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC2.jpg
Processed (88) - PNRP14_B.7.33_T232_SLIDE2_PIC4.jpg
Processed (89) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC4.jpg
Processed (90) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC3.jpg
Processed (91) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC3.jpg
Processed (92) - TOMB2_BURIAL6_T258_SLIDE5_PIC2.jpg
Processed (93) - PNRP12_B.4.22_T11_SLIDE6_PIC1.jpg
Processed (94) - PNRP14_B.5.35_T99_SLIDE4_PIC2.jpg
Processed (95) - PNRP14_B.5.33_T39_SLIDE3_PIC2.jpg
Processed (96) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC1.jpg
Processed (97) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC1.jpg
Processed (98) - PNRP14_B.5.35_T97_SLIDE2_PIC4.jpg
Processed (99) - PNRP14_B.5.15_T22_SLIDE5_PIC3.jpg
Processed (100) - PNRP14_B.5.35_T109_SLIDE2_PIC1.jpg
Processed (101) - PNRP14_B.5.35_T109_SLIDE3_PIC1.jpg
Processed (102) - PNRP14_B.6.36_T144_SLIDE4_PIC1.jpg
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Processed (103) - PNRP12_B.4.17_T8_SLIDE2_PIC1.jpg
Processed (104) - PNRP12_B.6.5.18_T189_SLIDE2_PIC4.jpg
Processed (105) - PNRP12_B.4.17_T6_SLIDE4_PIC3.jpg
Processed (106) - PNRP14_B.7.33_T232_SLIDE2_PIC1.jpg
Processed (107) - PNRP14_B.7.19.56_T194_SLIDE1_PIC3.jpg
Processed (108) - PNRP12_B.5.15_T267_SLIDE4_PIC3.jpg
Processed (109) - PNRP14_B.7.34_T247_SLIDE1_PIC1.jpg
Processed (110) - PNRP12_B.4.22_T10_SLIDE5_PIC11.jpg
Processed (111) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC2.jpg
Processed (112) - PNRP14_B.5.35_T109_SLIDE3_PIC2.jpg
Processed (113) - PNRP14_B.6.44_T154_SLIDE4_PIC3.jpg
Processed (114) - PNRP14_B.6.36_T144_SLIDE4_PIC2.jpg
Processed (115) - PNRP12_B.5.15_T266_SLIDE3_PIC1.jpg
Processed (116) - PNRP12_B.5.15_T266_SLIDE2_PIC1.jpg
Processed (117) - PNRP12_B.4.17_T8_SLIDE2_PIC2.jpg
Processed (118) - PNRP12_B.4.17_T8_SLIDE3_PIC2.jpg
Processed (119) - PNRP14_B.7.33_T274_SLIDE4_PIC2.jpg
Processed (120) - PNRP12_B.5.15_T267_SLIDE4_PIC1.jpg
Processed (121) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC4.jpg
Processed (122) - PNRP14_B.7.19.56_T199_SLIDE5_PIC1.jpg
Processed (123) - PNRP14_B.7.33_T232_SLIDE2_PIC2.jpg
Processed (124) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC2.jpg
Processed (125) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC5.jpg
Processed (126) - PNRP12_B.4.10_T2_SLIDE5_PIC1.jpg
Processed (127) - PNRP14_B.7.33_T232_SLIDE2_PIC3.jpg
Processed (128) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC5.jpg
Processed (129) - PNRP14_B.7.33_T274_SLIDE4_PIC3.jpg
Processed (130) - PNRP12_B.4.23_T12_SLIDE5_PIC4.jpg
Processed (131) - PNRP12_B.4.17_T8_SLIDE3_PIC3.jpg
Processed (132) - PNRP14_B.5.15_T22_SLIDE5_PIC1.jpg
Processed (133) - PNRP12_B.4.22_T10_SLIDE5_PIC12.jpg
Processed (134) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC3.jpg
Processed (135) - PNRP14_B.7.33_T237_SLIDE3_PIC2.jpg
Processed (136) - PNRP12_B.6.10.35_T135_SLIDE4_PIC3.jpg
Processed (137) - PNRP12_B.4.17_T282_SLIDE2_PIC2.jpg
Processed (138) - PNRP14_B.7.19.56_T192_SLIDE3_PIC3.jpg
Processed (139) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC2.jpg
Processed (140) - PNRP14_B.6.38_T275_SLIDE3_PIC3.jpg
Processed (141) - PNRP16_F.1.28.97.69_T312_SLIDE2_1.jpg
Processed (142) - PNRP12_B.5.15_T262_SLIDE4_PIC1.jpg
Processed (143) - PNRP14_B.6.37_T147_SLIDE4_PIC3.jpg
Processed (144) - PNRP14_B.7.31_T222_SLIDE2_PIC1.jpg
Processed (145) - PNRP12_B.4.10_T1_SLIDE3_PIC4.jpg
Processed (146) - PNRP12_B.4.22_T10_SLIDE4_PIC1.jpg
Processed (147) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC3.jpg
Processed (148) - PNRP14_B.7.33_T232_SLIDE6_PIC5.jpg
Processed (149) - PNRP14_B.7.33_T234_SLIDE1_PIC1.jpg
Processed (150) - PNRP14_B.6.38_T275_SLIDE2_PIC2.jpg
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Processed (151) - PNRP14_B.7.19.56_T192_SLIDE2_PIC2.jpg
Processed (152) - PNRP14_B.7.27_T211_SLIDE2_PIC2.jpg
Processed (153) - PNRP12_B.6.10.35_T135_SLIDE5_PIC2.jpg
Processed (154) - PNRP14_B.7.32_T226_SLIDE4_PIC1.jpg
Processed (155) - PNRP12_B.4.17_T282_SLIDE3_PIC3.jpg
Processed (156) - PNRP12_B.6.10.35_T135_SLIDE4_PIC2.jpg
Processed (157) - PNRP14_B.7.33_T237_SLIDE2_PIC3.jpg
Processed (158) - PNRP14_B.7.33_T237_SLIDE3_PIC3.jpg
Processed (159) - PNRP12_B.4.17_T282_SLIDE2_PIC1.jpg
Processed (160) - PNRP14_B.5.35_T93_SLIDE5_PIC4.jpg
Processed (161) - PNRP12_B.4.17_T282_SLIDE3_PIC1.jpg
Processed (162) - PNRP14_B.7.19.56_T195_SLIDE3_PIC4.jpg
Processed (163) - PNRP14_B.7.19.56_T195_SLIDE2_PIC4.jpg
Processed (164) - PNRP14_B.7.33_T234_SLIDE1_PIC3.jpg
Processed (165) - PNRP12_B.5.15_T262_SLIDE4_PIC2.jpg
Processed (166) - PNRP14_B.5.35_T73_SLIDE3_PIC4.jpg
Processed (167) - PNRP12_B.5.15_T263_SLIDE2_PIC2.jpg
Processed (168) - PNRP14_B.7.31_T222_SLIDE2_PIC2.jpg
Processed (169) - PNRP14_B.7.31_T222_SLIDE3_PIC2.jpg
Processed (170) - PNRP12_B.4.22_T10_SLIDE4_PIC3.jpg
Processed (171) - PNRP14_B.5.32.115_T33_SLIDE4_PIC4.jpg
Processed (172) - PNRP14_B.6.42_T276_SLIDE4_PIC4.jpg
Processed (173) - PNRP14_B.7.34_T245_SLIDE1_PIC5.jpg
Processed (174) - PNRP14_B.7.33_T232_SLIDE6_PIC6.jpg
Processed (175) - PNRP14_B.7.33_T234_SLIDE1_PIC2.jpg
Processed (176) - PNRP14_B.6.38_T275_SLIDE2_PIC1.jpg
Processed (177) - PNRP14_B.7.19.56_T192_SLIDE3_PIC1.jpg
Processed (178) - PNRP12_B.6.10.35_T135_SLIDE5_PIC1.jpg
Processed (179) - PNRP14_B.5.35_T93_SLIDE5_PIC1.jpg
Processed (180) - PNRP14_B.7.19.56_T195_SLIDE3_PIC1.jpg
Processed (181) - PNRP14_B.5.35_T73_SLIDE3_PIC1.jpg
Processed (182) - PNRP14_B.5.35_T73_SLIDE2_PIC1.jpg
Processed (183) - PNRP12_B.4.22_T10_2_SLIDE4_PIC2.jpg
Processed (184) - PNRP12_B.4.22_T10_2_SLIDE5_PIC2.jpg
Processed (185) - PNRP14_B.7.33_T232_SLIDE6_PIC2.jpg
Processed (186) - PNRP12_B.4.22_T10_SLIDE4_PIC6.jpg
Processed (187) - PNRP12_B.4.22_T10_SLIDE5_PIC6.jpg
Processed (188) - PNRP12_B.4.10_T1_SLIDE2_PIC3.jpg
Processed (189) - PNRP12_B.4.10_T1_SLIDE3_PIC2.jpg
Processed (190) - PNRP12_B.4.22_T10_SLIDE5_PIC7.jpg
Processed (191) - PNRP12_B.4.22_T10_SLIDE4_PIC7.jpg
Processed (192) - PNRP14_B.5.34_T59_SLIDE4_PIC2.jpg
Processed (193) - PNRP14_B.7.33_T232_SLIDE6_PIC3.jpg
Processed (194) - PNRP12_B.4.22_T10_2_SLIDE5_PIC3.jpg
Processed (195) - PNRP14_B.7.20_T202_SLIDE1_PIC13.jpg
Processed (196) - PNRP14_B.7.27_T211_SLIDE2_PIC4.jpg
Processed (197) - PNRP12_B.6.10.35_T135_SLIDE4_PIC4.jpg
Processed (198) - PNRP14_B.5.35_T93_SLIDE5_PIC2.jpg
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Processed (199) - PNRP14_B.7.19.56_T195_SLIDE3_PIC2.jpg
Processed (200) - PNRP14_B.5.35_T73_SLIDE3_PIC2.jpg
Processed (201) - PNRP14_B.7.33_T234_SLIDE1_PIC5.jpg
Processed (202) - PNRP12_B.4.22_T10_2_SLIDE5_PIC1.jpg
Processed (203) - PNRP12_B.4.22_T10_2_SLIDE4_PIC1.jpg
Processed (204) - PNRP14_B.7.33_T232_SLIDE6_PIC1.jpg
Processed (205) - PNRP12_B.4.22_T10_SLIDE5_PIC5.jpg
Processed (206) - PNRP12_B.4.22_T10_SLIDE4_PIC5.jpg
Processed (207) - PNRP14_B.5.35_T105_SLIDE4_PIC1.jpg
Processed (208) - PNRP16_F.1.28.115.S34_T298_SLIDE2_PIC3.jpg
Processed (209) - PNRP14_B.5.35.17_T72_SLIDE1_PIC1.jpg
Processed (210) - PNRP14_B.7.33_T234_SLIDE1_PIC4.jpg
Processed (211) - PNRP14_B.5.35_T73_SLIDE3_PIC3.jpg
Processed (212) - PNRP14_B.7.19.56_T195_SLIDE3_PIC3.jpg
Processed (213) - PNRP14_B.5.35_T90_SLIDE1_PIC3.jpg
Processed (214) - PNRP14_B.5.35_T73_SLIDE5_PIC1.jpg
Processed (215) - PNRP14_B.7.34_T247_SLIDE3_PIC3.jpg
Processed (216) - PNRP12_B.4.17_T282_SLIDE4_PIC4.jpg
Processed (217) - PNRP14_B.7.31_T219_SLIDE2_PIC3.jpg
Processed (218) - PNRP14_B.7.31_T219_SLIDE3_PIC3.jpg
Processed (219) - PNRP12_B.4.22_T10_SLIDE2_PIC6.jpg
Processed (220) - PNRP14_B.7.33_T232_SLIDE1_PIC2.jpg
Processed (221) - PNRP14_B.5.35_T85_SLIDE3_PIC2.jpg
Processed (222) - PNRP14_B.5.34_T59_SLIDE3_PIC2.jpg
Processed (223) - PNRP14_B.7.33_T232_SLIDE1_PIC3.jpg
Processed (224) - PNRP14_B.7.20_T202_SLIDE2_PIC2.jpg
Processed (225) - PNRP14_B.5.35_T85_SLIDE2_PIC3.jpg
Processed (226) - PNRP14_B.6.42_T276_SLIDE3_PIC1.jpg
Processed (227) - PNRP14_B.6.42_T276_SLIDE2_PIC1.jpg
Processed (228) - PNRP14_B.6.44_T165_SLIDE5_PIC2.jpg
Processed (229) - PNRP12_B.5.17_T29_SLIDE2_PIC2.jpg
Processed (230) - PNRP12_B.4.22_T10_SLIDE2_PIC7.jpg
Processed (231) - PNRP14_B.7.31_T219_SLIDE3_PIC2.jpg
Processed (232) - PNRP14_B.7.31_T219_SLIDE2_PIC2.jpg
Processed (233) - PNRP14_B.5.35_T110_SLIDE1_PIC2.jpg
Processed (234) - PNRP14_B.5.35_T90_SLIDE1_PIC2.jpg
Processed (235) - PNRP14_B.7.19.56_T192_SLIDE4_PIC4.jpg
Processed (236) - PNRP14_B.5.15_T22_SLIDE7_PIC3.jpg
Processed (237) - PNRP12_B.5.15_T262_SLIDE2_PIC4.jpg
Processed (238) - PNRP14_B.5.35_T73_SLIDE4_PIC2.jpg
Processed (239) - PNRP14_B.5.35.27_T281_SLIDE3_PIC3.jpg
Processed (240) - PNRP14_B.7.27_T210_SLIDE1_PIC14.jpg
Processed (241) - PNRP12_B.4.22_T10_SLIDE3_PIC5.jpg
Processed (242) - PNRP14_B.5.35_T105_SLIDE2_PIC1.jpg
Processed (243) - PNRP12_B.5.15_T26_SLIDE2_PIC1.jpg
Processed (244) - PNRP14_B.5.35_T85_SLIDE2_PIC1.jpg
Processed (245) - PNRP14_B.7.20_T202_SLIDE2_PIC1.jpg
Processed (246) - PNRP14_B.5.34_T59_SLIDE3_PIC1.jpg
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Processed (247) - PNRP14_B.6.44_T165_SLIDE4_PIC1.jpg
Processed (248) - PNRP12_B.4.22_T10_SLIDE3_PIC4.jpg
Processed (249) - PNRP14_B.5.32.115_T33_SLIDE3_PIC3.jpg
Processed (250) - PNRP12_B.4.22_T10_SLIDE2_PIC4.jpg
Processed (251) - PNRP14_B.7.31_T219_SLIDE2_PIC1.jpg
Processed (252) - PNRP14_B.7.31_T219_SLIDE3_PIC1.jpg
Processed (253) - PNRP14_B.7.34_T247_SLIDE2_PIC1.jpg
Processed (254) - PNRP12_B.5.31_T259_SLIDE3_PIC2.jpg
Processed (255) - PNRP14_B.5.35_T73_SLIDE5_PIC3.jpg
Processed (256) - PNRP14_B.6.43_T152_SLIDE2_PIC2.jpg
Processed (257) - PNRP12_B.5.15_T23_SLIDE6_PIC2.jpg
Processed (258) - PNRP12_B.4.17_T282_SLIDE4_PIC2.jpg
Processed (259) - PNRP14_B.5.34_T51_SLIDE3_PIC3.jpg
Processed (260) - PNRP14_B.6.44_T165_SLIDE4_PIC5.jpg
Processed (261) - PNRP14_B.7.33_T232_SLIDE1_PIC4.jpg
Processed (262) - PNRP14_B.7.20_T205_SLIDE2_PIC1.jpg
Processed (263) - PNRP12_B.4.22_T10_SLIDE3_PIC1.jpg
Processed (264) - PNRP14_B.6.37_T147_SLIDE3_PIC2.jpg
Processed (265) - PNRP14_B.5.34_T51_SLIDE3_PIC2.jpg
Processed (266) - PNRP14_B.7.31_T219_SLIDE2_PIC4.jpg
Processed (267) - PNRP12_B.4.17_T282_SLIDE4_PIC3.jpg
Processed (268) - PNRP12_B.6.10.35_T135_SLIDE3_PIC2.jpg
Processed (269) - PNRP12_B.4.22_T11_SLIDE5_PIC1.jpg
Processed (270) - PNRP14_B.6.38_T275_SLIDE4_PIC2.jpg
Processed (271) - PNRP14_B.6.43_T152_SLIDE2_PIC1.jpg
Processed (272) - PNRP14_B.7.32_T226_SLIDE3_PIC3.jpg
Processed (273) - PNRP12_B.4.17_T282_SLIDE4_PIC1.jpg
Processed (274) - PNRP14_B.6.44_T165_SLIDE5_PIC12.jpg
Processed (275) - PNRP14_B.6.44_T164_SLIDE3_PIC6.jpg
Processed (276) - PNRP12_B.4.22_T10_SLIDE3_PIC3.jpg
Processed (277) - PNRP12_B.4.22_T10_SLIDE2_PIC3.jpg
Processed (278) - PNRP12_B.4.22_T10_SLIDE6_PIC9.jpg
Processed (279) - PNRP14_B.7.33_T235_SLIDE1_PIC3.jpg
Processed (280) - PNRP14_B.7.33_T235_SLIDE1_PIC2.jpg
Processed (281) - PNRP12_B.4.22_T10_SLIDE6_PIC8.jpg
Processed (282) - PNRP12_B.4.23_T12_SLIDE6_PIC1.jpg
Processed (283) - PNRP12_B.4.23_T12_SLIDE7_PIC1.jpg
Processed (284) - PNRP12_B.4.22_T10_SLIDE2_PIC2.jpg
Processed (285) - PNRP14_B.6.37_T147_SLIDE3_PIC1.jpg
Processed (286) - PNRP14_B.7.27_T211_SLIDE4_PIC1.jpg
Processed (287) - PNRP12_B.6.10.35_T135_SLIDE2_PIC1.jpg
Processed (288) - TOMB2_BURIAL4_T257_SLIDE4_PIC1.jpg
Processed (289) - PNRP12_B.5.15_T262_SLIDE3_PIC3.jpg
Processed (290) - TOMB2_BURIAL4_T257_SLIDE5_PIC1.jpg
Processed (291) - PNRP14_B.7.19.56_T192_SLIDE4_PIC1.jpg
```

7 Self Hosted Inference - Adds Images to Folder without Annotating

```python
[149]: import os
       import supervision as sv
       from inference import get_model
       from PIL import Image
       import json


       model = get_model(model_id="annulation-region-detection/1", api_key="your key")

       directory = "./Flattened Images with Only Redone (RoboFlow)/"

       count = 0

       for dirpath, dirnames, files in os.walk(directory):
           for file in files:
               if file.lower().endswith(('.png', '.jpg', '.jpeg')):
                   path = os.path.join(dirpath, file)
                   image = Image.open(path)
                   results = model.infer(image=path)[0]
                   predictions_json = results.json()

                   predictions = json.loads(predictions_json)["predictions"]
                   detections = sv.Detections.from_inference(results)

                   confidence_threshold = 0.7

                   if len(predictions) > 0 and predictions[0]["confidence"] >␣
         ↪confidence_threshold:
                       image.save(os.path.join("./Identified Annulation Region - 70␣
         ↪percent confident/", file))
                       count += 1
                       print("Processed (" + str(count) + ") - " + file)
```

```
UserWarning: Specified provider 'CUDAExecutionProvider' is not in available
provider names.Available providers: 'CPUExecutionProvider'
UserWarning: Specified provider 'OpenVINOExecutionProvider' is not in available
provider names.Available providers: 'CPUExecutionProvider'

Processed (1) - TOMB2_COMMINGLED_T250_SLIDE2_PIC4.jpg
Processed (2) - PNRP14_B.5.35_T93_SLIDE6_PIC2.jpg
Processed (3) - PNRP14_B.6.36_T144_SLIDE2_PIC1.jpg
Processed (4) - PNRP14_B.5.34_SKULL9_T46_SLIDE3_PIC1.jpg
Processed (5) - PNRP14_B.5.34_SKULL9_T46_SLIDE2_PIC1.jpg
Processed (6) - PNRP14_B.5.35_T97_SLIDE4_PIC4.jpg
Processed (7) - PNRP14_B.7.19.56_T195_SLIDE1_PIC2.jpg
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Processed (8)  - PNRP14_B.6.44_T167_SLIDE5_PIC2.jpg
Processed (9)  - PNRP12_B.6.5.18_T189_SLIDE4_PIC4.jpg
Processed (10) - PNRP12_B.4.17_T6_SLIDE2_PIC3.jpg
Processed (11) - PNRP12_B.4.22_T10_2_SLIDE6_PIC1.jpg
Processed (12) - PNRP12_B.6.5.18_T189_SLIDE5_PIC4.jpg
Processed (13) - PNRP12_B.4.17_T6_SLIDE3_PIC3.jpg
Processed (14) - PNRP14_B.7.34_T245_SLIDE2_PIC2.jpg
Processed (15) - PNRP14_B.7.33_T232_SLIDE4_PIC1.jpg
Processed (16) - PNRP14_B.6.44_T166_SLIDE3_PIC2.jpg
Processed (17) - PNRP12_B.4.10_T2_SLIDE3_PIC2.jpg
Processed (18) - PNRP14_B.6.44_T166_SLIDE2_PIC2.jpg
Processed (19) - PNRP12_B.4.17_T8_SLIDE4_PIC1.jpg
Processed (20) - PNRP14_B.7.33_T274_SLIDE2_PIC1.jpg
Processed (21) - PNRP14_B.6.32_T142_SLIDE3_PIC1.jpg
Processed (22) - PNRP14_B.6.32_T142_SLIDE2_PIC1.jpg
Processed (23) - PNRP12_B.5.15_T267_SLIDE2_PIC2.jpg
Processed (24) - PNRP12_B.4.22_T10_SLIDE6_PIC5.jpg
Processed (25) - PNRP12_B.4.22_T10_SLIDE7_PIC5.jpg
Processed (26) - PNRP16_F.1.28.115.S34_T298_SLIDE1_PIC2.jpg
Processed (27) - PNRP16_F.1.28.115.S34_T298_SLIDE1_PIC3.jpg
Processed (28) - PNRP12_B.4.22_T10_SLIDE7_PIC4.jpg
Processed (29) - PNRP12_B.5.15_T267_SLIDE2_PIC3.jpg
Processed (30) - PNRP12_B.4.22_T10_SLIDE6_PIC4.jpg
Processed (31) - PNRP14_B.6.44_T165_SLIDE1_PIC1.jpg
Processed (32) - PNRP12_B.4.10_T1_SLIDE1_PIC1.jpg
Processed (33) - PNRP12_B.4.10_T2_SLIDE3_PIC3.jpg
Processed (34) - PNRP14_B.6.44_T166_SLIDE2_PIC3.jpg
Processed (35) - PNRP14_B.6.44_T166_SLIDE3_PIC3.jpg
Processed (36) - PNRP14_B.5.35.17_T72_SLIDE2_PIC1.jpg
Processed (37) - PNRP12_B.4.17_T6_SLIDE3_PIC2.jpg
Processed (38) - PNRP12_B.6.5.18_T189_SLIDE4_PIC5.jpg
Processed (39) - PNRP12_B.4.17_T6_SLIDE2_PIC2.jpg
Processed (40) - PNRP14_B.7.19.56_T195_SLIDE1_PIC3.jpg
Processed (41) - PNRP14_B.5.35_T90_SLIDE4_PIC1.jpg
Processed (42) - PNRP14_B.5.35_T90_SLIDE5_PIC1.jpg
Processed (43) - TOMB2_BURIAL6_T258_PIC4.jpg
Processed (44) - PNRP12_B.4.22_T10_SLIDE2_PIC10.jpg
Processed (45) - PNRP14_B.6.44_T154_SLIDE3_PIC1.jpg
Processed (46) - PNRP14_B.6.44_T154_SLIDE2_PIC3.jpg
Processed (47) - PNRP14_B.6.6_T183_SLIDE3_PIC1.jpg
Processed (48) - PNRP14_B.5.35_T99_SLIDE2_PIC5.jpg
Processed (49) - PNRP14_B.5.35_T93_SLIDE6_PIC1.jpg
Processed (50) - PNRP14_B.6.36_T144_SLIDE3_PIC2.jpg
Processed (51) - PNRP16_F.1.28.115.35_T320_SLIDE2_PIC2.jpg
Processed (52) - PNRP14_B.5.35_T90_SLIDE5_PIC3.jpg
Processed (53) - PNRP14_B.5.34_SKULL9_T46_SLIDE3_PIC2.jpg
Processed (54) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC4.jpg
Processed (55) - PNRP14_B.6.44_T167_SLIDE5_PIC1.jpg
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Processed (56) - PNRP14_B.7.19.56_T195_SLIDE1_PIC1.jpg
Processed (57) - PNRP12_B.4.22_T10_2_SLIDE6_PIC2.jpg
Processed (58) - PNRP14_B.7.19.56_T199_SLIDE2_PIC1.jpg
Processed (59) - PNRP14_B.7.33_T232_SLIDE5_PIC2.jpg
Processed (60) - PNRP14_B.7.19.56_T199_SLIDE3_PIC1.jpg
Processed (61) - PNRP14_B.7.34_T245_SLIDE2_PIC1.jpg
Processed (62) - PNRP14_B.7.33_T232_SLIDE4_PIC2.jpg
Processed (63) - PNRP14_B.6.44_T165_SLIDE5_PIC9.jpg
Processed (64) - PNRP14_B.6.44_T166_SLIDE2_PIC1.jpg
Processed (65) - PNRP12_B.4.10_T2_SLIDE3_PIC1.jpg
Processed (66) - PNRP14_B.6.44_T166_SLIDE3_PIC1.jpg
Processed (67) - PNRP12_B.4.17_T8_SLIDE4_PIC2.jpg
Processed (68) - PNRP14_B.7.33_T274_SLIDE3_PIC2.jpg
Processed (69) - PNRP14_B.6.44_T165_SLIDE1_PIC3.jpg
Processed (70) - PNRP14_B.7.33_T274_SLIDE2_PIC2.jpg
Processed (71) - PNRP12_B.4.22_T10_SLIDE7_PIC6.jpg
Processed (72) - PNRP12_B.4.22_T10_SLIDE6_PIC6.jpg
Processed (73) - PNRP12_B.5.15_T267_SLIDE2_PIC1.jpg
Processed (74) - PNRP16_F.1.28.115.S34_T298_SLIDE1_PIC1.jpg
Processed (75) - PNRP12_B.4.22_T10_SLIDE6_PIC7.jpg
Processed (76) - PNRP12_B.4.22_T10_SLIDE7_PIC7.jpg
Processed (77) - PNRP12_B.4.10_T1_SLIDE1_PIC2.jpg
Processed (78) - PNRP14_B.7.33_T274_SLIDE2_PIC3.jpg
Processed (79) - PNRP14_B.6.44_T165_SLIDE1_PIC2.jpg
Processed (80) - PNRP14_B.7.33_T274_SLIDE3_PIC3.jpg
Processed (81) - PNRP12_B.4.17_T8_SLIDE4_PIC3.jpg
Processed (82) - PNRP14_B.6.44_T165_SLIDE5_PIC8.jpg
Processed (83) - PNRP14_B.7.33_T232_SLIDE4_PIC3.jpg
Processed (84) - PNRP14_B.7.33_T232_SLIDE5_PIC3.jpg
Processed (85) - PNRP12_B.4.22_T10_2_SLIDE6_PIC3.jpg
Processed (86) - PNRP14_B.5.35.27_T280_SLIDE1_PIC1.jpg
Processed (87) - PNRP12_B.4.17_T6_SLIDE2_PIC1.jpg
Processed (88) - PNRP14_B.5.35.17_T72_SLIDE3_PIC2.jpg
Processed (89) - PNRP12_B.6.5.18_T189_SLIDE4_PIC6.jpg
Processed (90) - PNRP12_B.4.17_T6_SLIDE3_PIC1.jpg
Processed (91) - PNRP14_B.5.35.17_T72_SLIDE2_PIC2.jpg
Processed (92) - PNRP14_B.5.33_T39_SLIDE5_PIC4.jpg
Processed (93) - PNRP14_B.7.19.56_T192_SLIDE1_PIC4.jpg
Processed (94) - PNRP16_F.1.28.141.14_T300_SLIDE1_PIC1.jpg
Processed (95) - PNRP14_B.5.35_T90_SLIDE5_PIC2.jpg
Processed (96) - PNRP14_B.5.35_T90_SLIDE4_PIC2.jpg
Processed (97) - PNRP14_B.6.36_T144_SLIDE3_PIC3.jpg
Processed (98) - PNRP14_B.6.36_T144_SLIDE2_PIC3.jpg
Processed (99) - PNRP14_B.6.6_T184_SLIDE3_PIC4.jpg
Processed (100) - PNRP14_B.5.35_T99_SLIDE2_PIC4.jpg
Processed (101) - PNRP14_B.6.44_T154_SLIDE2_PIC2.jpg
Processed (102) - PNRP14_B.6.31_T141_SLIDE4_PIC2.jpg
Processed (103) - TOMB2_COMMINGLED_T250_SLIDE3_PIC2.jpg
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Processed (104) - PNRP14_B.7.33_T237_SLIDE1_PIC1.jpg
Processed (105) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC1.jpg
Processed (106) - PNRP14_B.7.33_T234_SLIDE2_PIC3.jpg
Processed (107) - PNRP14_B.7.33_T234_SLIDE3_PIC3.jpg
Processed (108) - TOMB2_BURIAL6_T258_PIC3.jpg
Processed (109) - TOMB2_BURIAL4_T257_SLIDE5_PIC2..jpg
Processed (110) - PNRP14_B.7.34_T245_SLIDE3_PIC4.jpg
Processed (111) - PNRP14_B.5.15_T19_SLIDE5_PIC1.jpg
Processed (112) - PNRP12_B.4.22_T10_SLIDE2_PIC9.jpg
Processed (113) - PNRP12_B.5.15_T263_SLIDE1_PIC2.jpg
Processed (114) - PNRP12_B.6.5.18_T189_SLIDE5_PIC2.jpg
Processed (115) - PNRP12_B.6.5.18_T189_SLIDE4_PIC2.jpg
Processed (116) - TOMB2_COMMINGLED_T251_SLIDE5_PIC2.jpg
Processed (117) - PNRP14_B.7.31_T222_SLIDE1_PIC2.jpg
Processed (118) - PNRP12_B.4.22_T10_SLIDE7_PIC3.jpg
Processed (119) - PNRP12_B.4.22_T10_SLIDE6_PIC3.jpg
Processed (120) - PNRP12_B.4.22_T10_SLIDE6_PIC2.jpg
Processed (121) - PNRP12_B.4.22_T10_SLIDE7_PIC2.jpg
Processed (122) - PNRP14_B.7.31_T222_SLIDE1_PIC3.jpg
Processed (123) - TOMB2_COMMINGLED_T251_SLIDE4_PIC3.jpg
Processed (124) - PNRP12_B.4.23_T12_SLIDE2_PIC1.jpg
Processed (125) - TOMB2_COMMINGLED_T251_SLIDE5_PIC3.jpg
Processed (126) - PNRP12_B.4.10_T2_SLIDE3_PIC5.jpg
Processed (127) - PNRP12_B.6.5.18_T189_SLIDE4_PIC3.jpg
Processed (128) - PNRP12_B.6.5.18_T189_SLIDE5_PIC3.jpg
Processed (129) - PNRP12_B.4.22_T10_SLIDE2_PIC8.jpg
Processed (130) - PNRP12_B.5.15_T263_SLIDE1_PIC3.jpg
Processed (131) - PNRP14_B.7.34_T245_SLIDE3_PIC5.jpg
Processed (132) - PNRP14_B.7.19.56_T192_SLIDE1_PIC1.jpg
Processed (133) - PNRP14_B.5.33_T39_SLIDE5_PIC1.jpg
Processed (134) - PNRP14_B.5.33_T39_SLIDE4_PIC1.jpg
Processed (135) - PNRP14_B.7.33_T234_SLIDE3_PIC2.jpg
Processed (136) - PNRP14_B.7.33_T234_SLIDE2_PIC2.jpg
Processed (137) - PNRP12_B.4.23_T12_SLIDE8_PIC2.jpg
Processed (138) - PNRP14_B.6.43_T151_SLIDE4_PIC2.jpg
Processed (139) - PNRP14_B.5.35_T99_SLIDE3_PIC1.jpg
Processed (140) - TOMB2_COMMINGLED_T250_SLIDE3_PIC3.jpg
Processed (141) - PNRP14_B.5.35_T99_SLIDE2_PIC1.jpg
Processed (142) - TOMB2_COMMINGLED_T250_SLIDE2_PIC3.jpg
Processed (143) - PNRP14_B.6.31_T141_SLIDE5_PIC1.jpg
Processed (144) - TOMB2_COMMINGLED_T250_SLIDE3_PIC1.jpg
Processed (145) - PNRP14_B.6.6_T184_SLIDE3_PIC3.jpg
Processed (146) - PNRP14_B.6.31_T141_SLIDE4_PIC1.jpg
Processed (147) - PNRP14_B.5.35_T99_SLIDE2_PIC3.jpg
Processed (148) - PNRP14_B.7.33_T237_SLIDE1_PIC2.jpg
Processed (149) - PNRP14_B.5.35_T97_SLIDE4_PIC1.jpg
Processed (150) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC2.jpg
Processed (151) - PNRP14_B.5.33_T39_SLIDE5_PIC3.jpg
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Processed (152) - PNRP14_B.7.19.56_T192_SLIDE1_PIC3.jpg
Processed (153) - PNRP16_F.1.28.141.14_T300_SLIDE1_PIC6.jpg
Processed (154) - PNRP12_B.5.15_T263_SLIDE1_PIC1.jpg
Processed (155) - PNRP14_B.7.34_T245_SLIDE3_PIC7.jpg
Processed (156) - PNRP14_B.7.33_T232_SLIDE5_PIC4.jpg
Processed (157) - PNRP12_B.6.5.18_T189_SLIDE4_PIC1.jpg
Processed (158) - PNRP12_B.6.5.18_T189_SLIDE5_PIC1.jpg
Processed (159) - PNRP14_B.7.33_T274_SLIDE3_PIC4.jpg
Processed (160) - TOMB2_COMMINGLED_T251_SLIDE4_PIC1.jpg
Processed (161) - PNRP14_B.6.31_T140_SLIDE3_PIC1.jpg
Processed (162) - PNRP14_B.7.31_T222_SLIDE1_PIC1.jpg
Processed (163) - PNRP16_F.1.28.97.69_T312_SLIDE2_PIC2.jpg
Processed (164) - PNRP12_B.4.22_T10_SLIDE7_PIC1.jpg
Processed (165) - PNRP12_B.4.22_T10_SLIDE6_PIC1.jpg
Processed (166) - PNRP14_B.7.34_T245_SLIDE3_PIC6.jpg
Processed (167) - PNRP14_B.5.33_T39_SLIDE5_PIC2.jpg
Processed (168) - PNRP14_B.7.19.56_T192_SLIDE1_PIC2.jpg
Processed (169) - PNRP14_B.5.35_T90_SLIDE4_PIC4.jpg
Processed (170) - PNRP14_B.5.35_T83_SLIDE1_PIC1.jpg
Processed (171) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC3.jpg
Processed (172) - PNRP14_B.7.33_T234_SLIDE3_PIC1.jpg
Processed (173) - PNRP14_B.7.33_T237_SLIDE1_PIC3.jpg
Processed (174) - PNRP12_B.4.22_T11_SLIDE1_PIC1.jpg
Processed (175) - PNRP14_B.6.43_T151_SLIDE4_PIC1.jpg
Processed (176) - PNRP14_B.6.44_T154_SLIDE2_PIC4.jpg
Processed (177) - PNRP14_B.5.35_T99_SLIDE2_PIC2.jpg
Processed (178) - PNRP12_B.5.31_T283_SLIDE1_PIC3.jpg
Processed (179) - PNRP14_B.5.35_T99_SLIDE3_PIC2.jpg
Processed (180) - PNRP14_B.6.6_T184_SLIDE3_PIC2.jpg
Processed (181) - PNRP14_B.5.35_T97_SLIDE2_PIC2.jpg
Processed (182) - PNRP14_B.7.31_T272_SLIDE1_PIC1.jpg
Processed (183) - PNRP14_B.5.35_T77_SLIDE4_PIC2.jpg
Processed (184) - PNRP12_B.5.15_T23_SLIDE5_PIC1.jpg
Processed (185) - PNRP14_B.7.33_T228_SLIDE1_PIC4.jpg
Processed (186) - TOMB2_COMMINGLED_T251_SLIDE2_PIC2.jpg
Processed (187) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC1.jpg
Processed (188) - PNRP12_B.4.22_T10_SLIDE5_PIC9.jpg
Processed (189) - PNRP12_B.6.5.18_T189_SLIDE2_PIC2.jpg
Processed (190) - PNRP14_B.7.20_T205_SLIDE1_PIC2.jpg
Processed (191) - PNRP14_B.7.19.56_T194_SLIDE1_PIC4.jpg
Processed (192) - PNRP12_B.4.10_T2_SLIDE5_PIC5.jpg
Processed (193) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC1.jpg
Processed (194) - PNRP14_B.7.33_T235_SLIDE2_PIC2.jpg
Processed (195) - PNRP12_B.6.5.18_T189_SLIDE2_PIC3.jpg
Processed (196) - PNRP14_B.7.20_T205_SLIDE1_PIC3.jpg
Processed (197) - PNRP12_B.4.17_T6_SLIDE4_PIC4.jpg
Processed (198) - PNRP12_B.4.22_T10_SLIDE5_PIC8.jpg
Processed (199) - PNRP12_B.4.23_T12_SLIDE5_PIC1.jpg
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Processed (200) - TOMB2_COMMINGLED_T251_SLIDE3_PIC3.jpg
Processed (201) - TOMB2_COMMINGLED_T251_SLIDE2_PIC3.jpg
Processed (202) - TOMB2_BURIAL6_T258_SLIDE5_PIC1.jpg
Processed (203) - PNRP14_B.6.43_T151_SLIDE2_PIC2.jpg
Processed (204) - PNRP14_B.5.34_T51_SLIDE1_PIC1.jpg
Processed (205) - PNRP14_B.5.33_T39_SLIDE3_PIC1.jpg
Processed (206) - PNRP14_B.5.15_T22_SLIDE5_PIC4.jpg
Processed (207) - PNRP14_B.5.35_T97_SLIDE2_PIC3.jpg
Processed (208) - PNRP14_B.5.35_T97_SLIDE3_PIC3.jpg
Processed (209) - PNRP14_B.5.35_T97_SLIDE2_PIC1.jpg
Processed (210) - PNRP14_B.6.43_T152_SLIDE1_PIC2.jpg
Processed (211) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC4.jpg
Processed (212) - PNRP14_B.5.33_T39_SLIDE3_PIC3.jpg
Processed (213) - PNRP14_B.6.31_T141_SLIDE2_PIC1.jpg
Processed (214) - PNRP14_B.5.35_T99_SLIDE4_PIC3.jpg
Processed (215) - PNRP14_B.7.31_T272_SLIDE1_PIC2.jpg
Processed (216) - PNRP14_B.5.35_T59_SLIDE1_PIC4.jpg
Processed (217) - PNRP14_B.5.35_T77_SLIDE4_PIC1.jpg
Processed (218) - PNRP12_B.5.15_T23_SLIDE5_PIC2.jpg
Processed (219) - PNRP14_B.7.33_T274_SLIDE4_PIC4.jpg
Processed (220) - TOMB2_COMMINGLED_T251_SLIDE3_PIC1.jpg
Processed (221) - PNRP12_B.4.23_T12_SLIDE5_PIC3.jpg
Processed (222) - TOMB2_COMMINGLED_T251_SLIDE2_PIC1.jpg
Processed (223) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC2.jpg
Processed (224) - PNRP14_B.7.33_T232_SLIDE2_PIC4.jpg
Processed (225) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC4.jpg
Processed (226) - PNRP12_B.5.15_T26_SLIDE1_PIC4.jpg
Processed (227) - PNRP14_B.7.20_T205_SLIDE1_PIC1.jpg
Processed (228) - PNRP12_B.6.5.18_T189_SLIDE2_PIC1.jpg
Processed (229) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC3.jpg
Processed (230) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC2.jpg
Processed (231) - PNRP14_B.5.35_T82_SLIDE1_PIC1.jpg
Processed (232) - PNRP12_B.5.15_T26_SLIDE1_PIC5.jpg
Processed (233) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC3.jpg
Processed (234) - TOMB2_BURIAL6_T258_SLIDE5_PIC2.jpg
Processed (235) - PNRP12_B.4.23_T12_SLIDE5_PIC2.jpg
Processed (236) - PNRP14_B.6.43_T151_SLIDE2_PIC1.jpg
Processed (237) - PNRP12_B.4.22_T11_SLIDE6_PIC1.jpg
Processed (238) - PNRP14_B.6.44_T154_SLIDE4_PIC4.jpg
Processed (239) - PNRP14_B.5.35_T99_SLIDE4_PIC2.jpg
Processed (240) - PNRP14_B.5.33_T39_SLIDE3_PIC2.jpg
Processed (241) - PNRP14_B.6.43_T152_SLIDE1_PIC3.jpg
Processed (242) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC1.jpg
Processed (243) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC1.jpg
Processed (244) - PNRP12_B.4.22_T10_SLIDE5_PIC10.jpg
Processed (245) - PNRP14_B.5.35_T97_SLIDE2_PIC4.jpg
Processed (246) - PNRP14_B.5.35_T97_SLIDE3_PIC4.jpg
Processed (247) - PNRP14_B.6.44_T167_SLIDE3_PIC2.jpg
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Processed (248) - PNRP14_B.5.15_T22_SLIDE5_PIC3.jpg
Processed (249) - PNRP14_B.5.35_T109_SLIDE2_PIC1.jpg
Processed (250) - PNRP14_B.5.35_T59_SLIDE1_PIC1.jpg
Processed (251) - PNRP14_B.5.35_T109_SLIDE3_PIC1.jpg
Processed (252) - PNRP14_B.6.36_T144_SLIDE4_PIC1.jpg
Processed (253) - PNRP12_B.5.15_T266_SLIDE2_PIC2.jpg
Processed (254) - PNRP12_B.4.17_T8_SLIDE3_PIC1.jpg
Processed (255) - PNRP12_B.4.17_T8_SLIDE2_PIC1.jpg
Processed (256) - PNRP14_B.6.32_T142_SLIDE4_PIC1.jpg
Processed (257) - PNRP14_B.7.33_T274_SLIDE4_PIC1.jpg
Processed (258) - PNRP14_B.7.33_T228_SLIDE1_PIC2.jpg
Processed (259) - PNRP12_B.5.15_T267_SLIDE4_PIC2.jpg
Processed (260) - PNRP12_B.5.15_T26_SLIDE1_PIC1.jpg
Processed (261) - PNRP12_B.6.5.18_T189_SLIDE2_PIC4.jpg
Processed (262) - PNRP12_B.4.17_T6_SLIDE4_PIC3.jpg
Processed (263) - PNRP14_B.7.33_T232_SLIDE2_PIC1.jpg
Processed (264) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC1.jpg
Processed (265) - PNRP14_B.5.35_T85_SLIDE1_PIC1.jpg
Processed (266) - PNRP14_B.7.19.56_T194_SLIDE1_PIC2.jpg
Processed (267) - PNRP12_B.4.10_T2_SLIDE5_PIC2.jpg
Processed (268) - PNRP12_B.4.10_T2_SLIDE4_PIC2.jpg
Processed (269) - PNRP14_B.7.34_T248_SLIDE1_PIC2.jpg
Processed (270) - PNRP14_B.7.19.56_T194_SLIDE1_PIC3.jpg
Processed (271) - PNRP14_B.7.20_T202_SLIDE1_PIC1.jpg
Processed (272) - PNRP12_B.4.17_T6_SLIDE4_PIC2.jpg
Processed (273) - PNRP12_B.5.15_T267_SLIDE4_PIC3.jpg
Processed (274) - PNRP12_B.5.15_T266_SLIDE2_PIC3.jpg
Processed (275) - PNRP14_B.5.35_T110_SLIDE3_PIC1.jpg
Processed (276) - PNRP14_B.7.34_T247_SLIDE1_PIC1.jpg
Processed (277) - PNRP14_B.5.35_T110_SLIDE2_PIC1.jpg
Processed (278) - PNRP14_B.6.44_T154_SLIDE4_PIC1.jpg
Processed (279) - PNRP14_B.6.28_T132_SLIDE3_PIC1.jpg
Processed (280) - PNRP14_B.5.15_T22_SLIDE5_PIC2.jpg
Processed (281) - PNRP14_B.6.44_T167_SLIDE3_PIC3.jpg
Processed (282) - PNRP12_B.4.22_T10_SLIDE5_PIC11.jpg
Processed (283) - PNRP14_B.5.35_T90_SLIDE3_PIC1.jpg
Processed (284) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC2.jpg
Processed (285) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC2.jpg
Processed (286) - PNRP14_B.6.43_T152_SLIDE1_PIC4.jpg
Processed (287) - PNRP12_B.4.22_T10_SLIDE5_PIC13.jpg
Processed (288) - PNRP14_B.6.44_T167_SLIDE2_PIC1.jpg
Processed (289) - PNRP14_B.6.44_T167_SLIDE3_PIC1.jpg
Processed (290) - PNRP14_B.5.35_T109_SLIDE3_PIC2.jpg
Processed (291) - PNRP14_B.6.44_T154_SLIDE4_PIC3.jpg
Processed (292) - PNRP14_B.5.35_T59_SLIDE1_PIC2.jpg
Processed (293) - PNRP14_B.5.35_T99_SLIDE4_PIC5.jpg
Processed (294) - PNRP14_B.6.36_T144_SLIDE4_PIC2.jpg
Processed (295) - PNRP14_B.7.34_T247_SLIDE1_PIC3.jpg
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Processed (296) - PNRP14_B.5.35_T93_SLIDE1_PIC1.jpg
Processed (297) - PNRP12_B.5.15_T266_SLIDE3_PIC1.jpg
Processed (298) - PNRP12_B.5.15_T266_SLIDE2_PIC1.jpg
Processed (299) - PNRP12_B.4.17_T8_SLIDE2_PIC2.jpg
Processed (300) - PNRP12_B.4.17_T8_SLIDE3_PIC2.jpg
Processed (301) - PNRP14_B.7.33_T228_SLIDE1_PIC1.jpg
Processed (302) - PNRP14_B.7.33_T274_SLIDE4_PIC2.jpg
Processed (303) - PNRP14_B.6.32_T142_SLIDE4_PIC2.jpg
Processed (304) - PNRP12_B.5.15_T267_SLIDE4_PIC1.jpg
Processed (305) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC4.jpg
Processed (306) - PNRP12_B.5.15_T26_SLIDE1_PIC2.jpg
Processed (307) - PNRP14_B.7.19.56_T199_SLIDE5_PIC1.jpg
Processed (308) - PNRP14_B.5.35_T85_SLIDE1_PIC2.jpg
Processed (309) - PNRP14_B.7.33_T232_SLIDE2_PIC2.jpg
Processed (310) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC2.jpg
Processed (311) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC5.jpg
Processed (312) - PNRP14_B.7.34_T248_SLIDE1_PIC1.jpg
Processed (313) - PNRP12_B.4.10_T2_SLIDE4_PIC1.jpg
Processed (314) - PNRP14_B.7.19.56_T194_SLIDE1_PIC1.jpg
Processed (315) - PNRP12_B.4.10_T2_SLIDE5_PIC1.jpg
Processed (316) - PNRP14_B.6.44_T165_SLIDE3_PIC8.jpg
Processed (317) - PNRP14_B.7.20_T202_SLIDE1_PIC2.jpg
Processed (318) - PNRP14_B.5.35_T85_SLIDE1_PIC3.jpg
Processed (319) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC3.jpg
Processed (320) - PNRP14_B.7.33_T232_SLIDE2_PIC3.jpg
Processed (321) - PNRP12_B.4.17_T6_SLIDE4_PIC1.jpg
Processed (322) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC5.jpg
Processed (323) - PNRP14_B.7.33_T274_SLIDE4_PIC3.jpg
Processed (324) - PNRP12_B.4.23_T12_SLIDE5_PIC4.jpg
Processed (325) - PNRP12_B.4.17_T8_SLIDE3_PIC3.jpg
Processed (326) - PNRP12_B.4.17_T8_SLIDE2_PIC3.jpg
Processed (327) - PNRP14_B.7.34_T247_SLIDE1_PIC2.jpg
Processed (328) - PNRP14_B.6.36_T144_SLIDE4_PIC3.jpg
Processed (329) - PNRP14_B.5.35_T99_SLIDE4_PIC4.jpg
Processed (330) - PNRP14_B.6.44_T154_SLIDE4_PIC2.jpg
Processed (331) - PNRP14_B.6.28_T132_SLIDE3_PIC2.jpg
Processed (332) - PNRP14_B.5.33_T39_SLIDE3_PIC4.jpg
Processed (333) - PNRP14_B.5.15_T22_SLIDE5_PIC1.jpg
Processed (334) - PNRP12_B.4.22_T10_SLIDE5_PIC12.jpg
Processed (335) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC3.jpg
Processed (336) - PNRP14_B.7.33_T237_SLIDE3_PIC2.jpg
Processed (337) - PNRP14_B.7.33_T237_SLIDE2_PIC2.jpg
Processed (338) - PNRP14_B.5.35_T94_SLIDE4_PIC3.jpg
Processed (339) - PNRP12_B.4.17_T282_SLIDE3_PIC2.jpg
Processed (340) - PNRP12_B.6.10.35_T135_SLIDE4_PIC3.jpg
Processed (341) - PNRP14_B.6.34_T143_SLIDE3_PIC2.jpg
Processed (342) - PNRP12_B.4.17_T282_SLIDE2_PIC2.jpg
Processed (343) - TOMB2_COMMINGLED_T250_SLIDE1_PIC1.jpg
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Processed (344) - PNRP14_B.7.27_T211_SLIDE2_PIC3.jpg
Processed (345) - PNRP14_B.7.31_T219_SLIDE5_PIC5.jpg
Processed (346) - PNRP14_B.7.31_T272_SLIDE4_PIC2.jpg
Processed (347) - PNRP14_B.7.19.56_T192_SLIDE2_PIC3.jpg
Processed (348) - PNRP14_B.7.19.56_T192_SLIDE3_PIC3.jpg
Processed (349) - PNRP14_B.6.43_T152_SLIDE4_PIC2.jpg
Processed (350) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC2.jpg
Processed (351) - PNRP14_B.6.38_T275_SLIDE3_PIC3.jpg
Processed (352) - PNRP14_B.6.43_T152_SLIDE5_PIC2.jpg
Processed (353) - PNRP16_F.1.28.98.S1_T307_SLIDE2_PIC2.jpg
Processed (354) - PNRP16_F.1.28.97.69_T312_SLIDE2_1.jpg
Processed (355) - PNRP12_B.5.15_T262_SLIDE4_PIC1.jpg
Processed (356) - PNRP12_B.5.15_T263_SLIDE2_PIC1.jpg
Processed (357) - PNRP14_B.7.33_T232_SLIDE6_PIC4.jpg
Processed (358) - PNRP14_B.5.15_T19_SLIDE6_PIC2.jpg
Processed (359) - PNRP12_B.5.15_T263_SLIDE3_PIC1.jpg
Processed (360) - PNRP14_B.7.20_T205_SLIDE4_PIC1.jpg
Processed (361) - PNRP14_B.5.35_T105_SLIDE4_PIC4.jpg
Processed (362) - PNRP14_B.6.37_T147_SLIDE4_PIC3.jpg
Processed (363) - PNRP14_B.7.31_T222_SLIDE3_PIC1.jpg
Processed (364) - PNRP14_B.7.31_T222_SLIDE2_PIC1.jpg
Processed (365) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC2.jpg
Processed (366) - PNRP14_B.6.44_T165_SLIDE3_PIC5.jpg
Processed (367) - PNRP12_B.4.10_T1_SLIDE2_PIC5.jpg
Processed (368) - PNRP12_B.5.0_T17_SLIDE2_PIC2.jpg
Processed (369) - PNRP12_B.4.10_T1_SLIDE3_PIC4.jpg
Processed (370) - PNRP14_B.6.44_T165_SLIDE3_PIC4.jpg
Processed (371) - PNRP12_B.4.10_T1_SLIDE2_PIC4.jpg
Processed (372) - PNRP12_B.4.22_T10_SLIDE4_PIC1.jpg
Processed (373) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC3.jpg
Processed (374) - PNRP12_B.4.22_T10_SLIDE5_PIC1.jpg
Processed (375) - PNRP14_B.5.32.115_T34_SLIDE4_PIC2.jpg
Processed (376) - PNRP14_B.6.37_T147_SLIDE4_PIC2.jpg
Processed (377) - PNRP14_B.7.33_T232_SLIDE6_PIC5.jpg
Processed (378) - PNRP14_B.5.15_T19_SLIDE6_PIC3.jpg
Processed (379) - PNRP14_B.6.43_T152_SLIDE5_PIC3.jpg
Processed (380) - PNRP14_B.7.33_T234_SLIDE1_PIC1.jpg
Processed (381) - PNRP14_B.6.38_T275_SLIDE2_PIC2.jpg
Processed (382) - PNRP14_B.5.35_T83_SLIDE2_PIC1.jpg
Processed (383) - PNRP14_B.6.38_T275_SLIDE3_PIC2.jpg
Processed (384) - PNRP14_B.6.43_T152_SLIDE4_PIC3.jpg
Processed (385) - PNRP14_B.7.19.56_T192_SLIDE3_PIC2.jpg
Processed (386) - PNRP14_B.7.19.56_T192_SLIDE2_PIC2.jpg
Processed (387) - PNRP14_B.7.31_T219_SLIDE5_PIC4.jpg
Processed (388) - PNRP14_B.7.27_T211_SLIDE2_PIC2.jpg
Processed (389) - PNRP14_B.6.34_T143_SLIDE3_PIC3.jpg
Processed (390) - PNRP12_B.4.17_T282_SLIDE2_PIC3.jpg
Processed (391) - PNRP12_B.6.10.35_T135_SLIDE5_PIC2.jpg
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Processed (392) - PNRP14_B.7.32_T226_SLIDE4_PIC1.jpg
Processed (393) - PNRP12_B.4.17_T282_SLIDE3_PIC3.jpg
Processed (394) - PNRP12_B.6.10.35_T135_SLIDE4_PIC2.jpg
Processed (395) - PNRP14_B.5.35_T94_SLIDE4_PIC2.jpg
Processed (396) - PNRP14_B.7.33_T237_SLIDE2_PIC3.jpg
Processed (397) - PNRP12_B.4.22_T11_SLIDE3_PIC1.jpg
Processed (398) - PNRP12_B.4.22_T11_SLIDE2_PIC1.jpg
Processed (399) - PNRP14_B.7.33_T237_SLIDE3_PIC3.jpg
Processed (400) - PNRP14_B.7.33_T237_SLIDE2_PIC1.jpg
Processed (401) - PNRP14_B.7.32_T226_SLIDE4_PIC3.jpg
Processed (402) - PNRP12_B.4.17_T282_SLIDE2_PIC1.jpg
Processed (403) - PNRP14_B.5.35_T93_SLIDE5_PIC4.jpg
Processed (404) - PNRP12_B.4.17_T282_SLIDE3_PIC1.jpg
Processed (405) - PNRP14_B.7.31_T219_SLIDE5_PIC6.jpg
Processed (406) - PNRP14_B.7.31_T272_SLIDE4_PIC1.jpg
Processed (407) - PNRP14_B.7.19.56_T195_SLIDE3_PIC4.jpg
Processed (408) - PNRP14_B.7.19.56_T195_SLIDE2_PIC4.jpg
Processed (409) - PNRP14_B.7.33_T234_SLIDE1_PIC3.jpg
Processed (410) - PNRP16_F.1.28.98.S1_T307_SLIDE2_PIC1.jpg
Processed (411) - PNRP14_B.6.43_T152_SLIDE5_PIC1.jpg
Processed (412) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC1.jpg
Processed (413) - PNRP14_B.6.43_T152_SLIDE4_PIC1.jpg
Processed (414) - PNRP12_B.5.15_T262_SLIDE4_PIC2.jpg
Processed (415) - PNRP14_B.5.35_T73_SLIDE3_PIC4.jpg
Processed (416) - PNRP12_B.5.15_T263_SLIDE3_PIC2.jpg
Processed (417) - PNRP12_B.5.15_T263_SLIDE2_PIC2.jpg
Processed (418) - PNRP14_B.7.20_T205_SLIDE4_PIC2.jpg
Processed (419) - PNRP14_B.7.31_T222_SLIDE2_PIC2.jpg
Processed (420) - PNRP14_B.7.31_T222_SLIDE3_PIC2.jpg
Processed (421) - PNRP12_B.4.22_T10_SLIDE4_PIC3.jpg
Processed (422) - PNRP14_B.5.32.115_T33_SLIDE4_PIC4.jpg
Processed (423) - PNRP14_B.5.32.115_T33_SLIDE5_PIC4.jpg
Processed (424) - PNRP12_B.4.22_T10_SLIDE5_PIC3.jpg
Processed (425) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC1.jpg
Processed (426) - PNRP14_B.6.44_T165_SLIDE3_PIC6.jpg
Processed (427) - PNRP14_B.6.44_T165_SLIDE3_PIC7.jpg
Processed (428) - PNRP14_B.5.32.115_T33_SLIDE4_PIC5.jpg
Processed (429) - PNRP12_B.4.22_T10_SLIDE4_PIC2.jpg
Processed (430) - PNRP14_B.7.31_T222_SLIDE2_PIC3.jpg
Processed (431) - PNRP14_B.5.32.115_T34_SLIDE4_PIC1.jpg
Processed (432) - PNRP14_B.7.20_T205_SLIDE4_PIC3.jpg
Processed (433) - PNRP14_B.6.42_T276_SLIDE4_PIC4.jpg
Processed (434) - PNRP12_B.5.15_T263_SLIDE2_PIC3.jpg
Processed (435) - PNRP14_B.7.34_T245_SLIDE1_PIC5.jpg
Processed (436) - PNRP14_B.7.33_T232_SLIDE6_PIC6.jpg
Processed (437) - PNRP14_B.6.38_T275_SLIDE3_PIC1.jpg
Processed (438) - PNRP14_B.7.33_T234_SLIDE1_PIC2.jpg
Processed (439) - PNRP14_B.6.38_T275_SLIDE2_PIC1.jpg
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Processed (440) - PNRP16_F.1.28.141.14_T300_SLIDE3_PIC4.jpg
Processed (441) - PNRP14_B.7.19.56_T192_SLIDE2_PIC1.jpg
Processed (442) - PNRP14_B.7.19.56_T192_SLIDE3_PIC1.jpg
Processed (443) - PNRP14_B.7.27_T211_SLIDE2_PIC1.jpg
Processed (444) - PNRP14_B.5.35_T93_SLIDE5_PIC5.jpg
Processed (445) - PNRP12_B.6.10.35_T135_SLIDE5_PIC1.jpg
Processed (446) - PNRP14_B.7.32_T226_SLIDE4_PIC2.jpg
Processed (447) - PNRP14_B.5.35_T94_SLIDE5_PIC1.jpg
Processed (448) - PNRP14_B.5.35_T94_SLIDE4_PIC1.jpg
Processed (449) - PNRP12_B.4.22_T11_SLIDE3_PIC2.jpg
Processed (450) - PNRP14_B.5.35_T93_SLIDE4_PIC1.jpg
Processed (451) - PNRP14_B.5.35_T93_SLIDE5_PIC1.jpg
Processed (452) - PNRP12_B.6.10.35_T135_SLIDE4_PIC5.jpg
Processed (453) - PNRP14_B.7.31_T219_SLIDE5_PIC3.jpg
Processed (454) - PNRP14_B.7.19.56_T195_SLIDE3_PIC1.jpg
Processed (455) - PNRP14_B.7.19.56_T195_SLIDE2_PIC1.jpg
Processed (456) - PNRP14_B.5.35_T73_SLIDE3_PIC1.jpg
Processed (457) - PNRP14_B.5.35_T73_SLIDE2_PIC1.jpg
Processed (458) - PNRP14_B.6.43_T152_SLIDE5_PIC4.jpg
Processed (459) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC4.jpg
Processed (460) - PNRP14_B.6.44_T166_SLIDE1_PIC1.jpg
Processed (461) - PNRP14_B.7.34_T248_SLIDE4_PIC1.jpg
Processed (462) - PNRP12_B.4.22_T10_2_SLIDE4_PIC2.jpg
Processed (463) - PNRP12_B.4.22_T10_2_SLIDE5_PIC2.jpg
Processed (464) - PNRP14_B.7.33_T232_SLIDE6_PIC2.jpg
Processed (465) - PNRP14_B.7.34_T245_SLIDE1_PIC1.jpg
Processed (466) - PNRP14_B.5.35_T85_SLIDE4_PIC2.jpg
Processed (467) - PNRP12_B.4.22_T10_SLIDE4_PIC6.jpg
Processed (468) - PNRP12_B.5.15_T267_SLIDE1_PIC1.jpg
Processed (469) - PNRP14_B.5.32.115_T33_SLIDE5_PIC1.jpg
Processed (470) - PNRP12_B.4.22_T10_SLIDE5_PIC6.jpg
Processed (471) - PNRP16_F.1.28.115.S34_T298_SLIDE2_PIC1.jpg
Processed (472) - PNRP14_B.5.35_T105_SLIDE4_PIC2.jpg
Processed (473) - PNRP14_B.6.44_T165_SLIDE2_PIC3.jpg
Processed (474) - PNRP12_B.4.10_T1_SLIDE3_PIC3.jpg
Processed (475) - PNRP14_B.7.33_T228_SLIDE4_PIC1.jpg
Processed (476) - PNRP12_B.4.10_T1_SLIDE2_PIC3.jpg
Processed (477) - PNRP14_B.6.44_T165_SLIDE3_PIC2.jpg
Processed (478) - PNRP12_B.4.10_T1_SLIDE2_PIC2.jpg
Processed (479) - PNRP12_B.4.10_T1_SLIDE3_PIC2.jpg
Processed (480) - PNRP14_B.6.37_T147_SLIDE4_PIC4.jpg
Processed (481) - PNRP14_B.5.35_T105_SLIDE4_PIC3.jpg
Processed (482) - PNRP12_B.4.22_T10_SLIDE5_PIC7.jpg
Processed (483) - PNRP12_B.4.22_T10_SLIDE4_PIC7.jpg
Processed (484) - PNRP14_B.5.35_T85_SLIDE4_PIC3.jpg
Processed (485) - PNRP14_B.5.34_T59_SLIDE4_PIC2.jpg
Processed (486) - PNRP14_B.7.33_T232_SLIDE6_PIC3.jpg
Processed (487) - PNRP14_B.6.42_T276_SLIDE4_PIC1.jpg
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Processed (488) - PNRP12_B.4.22_T10_2_SLIDE5_PIC3.jpg
Processed (489) - PNRP14_B.5.35.27_T280_SLIDE2_PIC1.jpg
Processed (490) - PNRP14_B.5.35.17_T72_SLIDE1_PIC2.jpg
Processed (491) - PNRP14_B.5.35.27_T281_SLIDE5_PIC1.jpg
Processed (492) - PNRP16_F.1.28.115.35_T320_SLIDE1_PIC3.jpg
Processed (493) - PNRP12_B.5.31_T259_SLIDE4_PIC1.jpg
Processed (494) - PNRP14_B.7.19.56_T192_SLIDE2_PIC4.jpg
Processed (495) - PNRP14_B.7.20_T202_SLIDE1_PIC13.jpg
Processed (496) - PNRP14_B.7.31_T219_SLIDE5_PIC2.jpg
Processed (497) - PNRP14_B.7.27_T211_SLIDE2_PIC4.jpg
Processed (498) - PNRP14_B.6.44_T154_SLIDE1_PIC2.jpg
Processed (499) - PNRP12_B.6.10.35_T135_SLIDE4_PIC4.jpg
Processed (500) - PNRP14_B.5.35_T93_SLIDE5_PIC2.jpg
Processed (501) - PNRP14_B.5.35_T93_SLIDE4_PIC2.jpg
Processed (502) - PNRP14_B.7.19.56_T195_SLIDE2_PIC2.jpg
Processed (503) - PNRP14_B.7.19.56_T195_SLIDE3_PIC2.jpg
Processed (504) - PNRP14_B.5.35_T73_SLIDE2_PIC2.jpg
Processed (505) - PNRP12_B.5.31_T259_SLIDE4_PIC3.jpg
Processed (506) - PNRP16_F.1.28.115.35_T320_SLIDE1_PIC1.jpg
Processed (507) - PNRP14_B.5.35_T73_SLIDE3_PIC2.jpg
Processed (508) - PNRP14_B.7.33_T234_SLIDE1_PIC5.jpg
Processed (509) - PNRP14_B.7.34_T248_SLIDE4_PIC2.jpg
Processed (510) - PNRP14_B.6.44_T166_SLIDE1_PIC2.jpg
Processed (511) - PNRP12_B.4.22_T10_2_SLIDE5_PIC1.jpg
Processed (512) - PNRP14_B.6.42_T276_SLIDE4_PIC3.jpg
Processed (513) - PNRP12_B.4.22_T10_2_SLIDE4_PIC1.jpg
Processed (514) - PNRP14_B.6.42_T276_SLIDE5_PIC3.jpg
Processed (515) - PNRP14_B.5.35_T85_SLIDE4_PIC1.jpg
Processed (516) - PNRP14_B.7.34_T245_SLIDE1_PIC2.jpg
Processed (517) - PNRP14_B.7.33_T232_SLIDE6_PIC1.jpg
Processed (518) - PNRP14_B.5.32.115_T33_SLIDE5_PIC2.jpg
Processed (519) - PNRP12_B.4.22_T10_SLIDE5_PIC5.jpg
Processed (520) - PNRP12_B.5.15_T267_SLIDE1_PIC2.jpg
Processed (521) - PNRP12_B.4.22_T10_SLIDE4_PIC5.jpg
Processed (522) - PNRP16_F.1.28.115.S34_T298_SLIDE3_PIC2.jpg
Processed (523) - PNRP14_B.5.35_T105_SLIDE4_PIC1.jpg
Processed (524) - PNRP14_B.7.33_T228_SLIDE4_PIC2.jpg
Processed (525) - PNRP14_B.6.44_T165_SLIDE2_PIC1.jpg
Processed (526) - PNRP12_B.4.10_T1_SLIDE2_PIC1.jpg
Processed (527) - PNRP14_B.6.44_T165_SLIDE3_PIC1.jpg
Processed (528) - PNRP12_B.5.17_T29_SLIDE4_PIC1.jpg
Processed (529) - PNRP16_F.1.28.115.S34_T298_SLIDE2_PIC3.jpg
Processed (530) - PNRP14_B.5.32.115_T33_SLIDE4_PIC3.jpg
Processed (531) - PNRP12_B.4.22_T10_SLIDE4_PIC4.jpg
Processed (532) - PNRP12_B.4.22_T10_SLIDE5_PIC4.jpg
Processed (533) - PNRP12_B.5.15_T267_SLIDE1_PIC3.jpg
Processed (534) - PNRP14_B.5.34_T59_SLIDE5_PIC1.jpg
Processed (535) - PNRP14_B.5.34_T59_SLIDE4_PIC1.jpg
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Processed (536) - PNRP14_B.5.35.17_T72_SLIDE1_PIC1.jpg
Processed (537) - PNRP14_B.6.42_T276_SLIDE5_PIC2.jpg
Processed (538) - PNRP14_B.5.35.27_T280_SLIDE2_PIC2.jpg
Processed (539) - PNRP14_B.6.42_T276_SLIDE4_PIC2.jpg
Processed (540) - PNRP14_B.7.34_T248_SLIDE4_PIC3.jpg
Processed (541) - PNRP14_B.7.33_T234_SLIDE1_PIC4.jpg
Processed (542) - PNRP14_B.5.35.27_T281_SLIDE5_PIC2.jpg
Processed (543) - PNRP14_B.5.35_T73_SLIDE3_PIC3.jpg
Processed (544) - PNRP16_F.1.28.141.14_T300_SLIDE3_PIC2.jpg
Processed (545) - PNRP14_B.7.19.56_T195_SLIDE3_PIC3.jpg
Processed (546) - PNRP14_B.7.19.56_T195_SLIDE2_PIC3.jpg
Processed (547) - PNRP14_B.7.31_T219_SLIDE5_PIC1.jpg
Processed (548) - PNRP14_B.6.44_T154_SLIDE1_PIC1.jpg
Processed (549) - PNRP14_B.5.35_T93_SLIDE4_PIC3.jpg
Processed (550) - PNRP14_B.5.35_T73_SLIDE4_PIC1.jpg
Processed (551) - PNRP14_B.5.35_T90_SLIDE1_PIC3.jpg
Processed (552) - PNRP14_B.5.35_T73_SLIDE5_PIC1.jpg
Processed (553) - PNRP14_B.7.34_T247_SLIDE3_PIC3.jpg
Processed (554) - PNRP14_B.5.35_T93_SLIDE3_PIC1.jpg
Processed (555) - PNRP12_B.5.15_T23_SLIDE7_PIC4.jpg
Processed (556) - PNRP12_B.4.17_T282_SLIDE4_PIC4.jpg
Processed (557) - PNRP14_B.5.35_T93_SLIDE2_PIC1.jpg
Processed (558) - PNRP12_B.5.15_T266_SLIDE1_PIC1.jpg
Processed (559) - PNRP14_B.5.35_T59_SLIDE3_PIC2.jpg
Processed (560) - PNRP14_B.6.28_T132_SLIDE1_PIC3.jpg
Processed (561) - PNRP14_B.7.31_T219_SLIDE2_PIC3.jpg
Processed (562) - PNRP14_B.7.31_T219_SLIDE3_PIC3.jpg
Processed (563) - PNRP12_B.4.22_T10_SLIDE2_PIC6.jpg
Processed (564) - PNRP14_B.5.35_T105_SLIDE3_PIC2.jpg
Processed (565) - PNRP12_B.5.17_T29_SLIDE2_PIC3.jpg
Processed (566) - PNRP14_B.6.44_T165_SLIDE5_PIC3.jpg
Processed (567) - PNRP14_B.7.33_T228_SLIDE2_PIC1.jpg
Processed (568) - PNRP14_B.6.44_T165_SLIDE4_PIC3.jpg
Processed (569) - PNRP14_B.7.19.56_T194_SLIDE3_PIC1.jpg
Processed (570) - PNRP14_B.7.19.56_T194_SLIDE2_PIC1.jpg
Processed (571) - PNRP12_B.5.15_T26_SLIDE3_PIC2.jpg
Processed (572) - PNRP14_B.7.33_T232_SLIDE1_PIC2.jpg
Processed (573) - PNRP14_B.5.35_T85_SLIDE2_PIC2.jpg
Processed (574) - PNRP14_B.7.20_T202_SLIDE2_PIC3.jpg
Processed (575) - PNRP14_B.5.35_T85_SLIDE3_PIC2.jpg
Processed (576) - PNRP14_B.5.34_T59_SLIDE3_PIC3.jpg
Processed (577) - PNRP14_B.5.34_T59_SLIDE3_PIC2.jpg
Processed (578) - PNRP14_B.5.35_T85_SLIDE3_PIC3.jpg
Processed (579) - PNRP14_B.7.33_T232_SLIDE1_PIC3.jpg
Processed (580) - PNRP14_B.7.20_T202_SLIDE2_PIC2.jpg
Processed (581) - PNRP14_B.5.35_T85_SLIDE2_PIC3.jpg
Processed (582) - PNRP14_B.6.42_T276_SLIDE3_PIC1.jpg
Processed (583) - PNRP14_B.6.42_T276_SLIDE2_PIC1.jpg
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Processed (584) - PNRP14_B.6.44_T165_SLIDE4_PIC2.jpg
Processed (585) - PNRP14_B.6.44_T165_SLIDE5_PIC2.jpg
Processed (586) - PNRP12_B.5.17_T29_SLIDE3_PIC2.jpg
Processed (587) - PNRP12_B.5.17_T29_SLIDE2_PIC2.jpg
Processed (588) - PNRP14_B.5.35_T105_SLIDE3_PIC3.jpg
Processed (589) - PNRP14_B.5.35_T105_SLIDE2_PIC3.jpg
Processed (590) - PNRP12_B.4.22_T10_SLIDE2_PIC7.jpg
Processed (591) - PNRP14_B.7.31_T219_SLIDE3_PIC2.jpg
Processed (592) - PNRP14_B.7.31_T219_SLIDE2_PIC2.jpg
Processed (593) - PNRP14_B.5.35_T59_SLIDE3_PIC3.jpg
Processed (594) - PNRP14_B.6.28_T132_SLIDE1_PIC2.jpg
Processed (595) - PNRP14_B.6.44_T164_SLIDE2_PIC2.jpg
Processed (596) - PNRP14_B.7.34_T238_SLIDE7_PIC4.jpg
Processed (597) - PNRP14_B.7.34_T247_SLIDE2_PIC2.jpg
Processed (598) - PNRP14_B.5.35_T110_SLIDE1_PIC2.jpg
Processed (599) - PNRP14_B.5.35.27_T281_SLIDE2_PIC1.jpg
Processed (600) - PNRP14_B.5.35.27_T281_SLIDE3_PIC1.jpg
Processed (601) - PNRP14_B.5.35_T90_SLIDE1_PIC2.jpg
Processed (602) - PNRP14_B.5.15_T22_SLIDE7_PIC1.jpg
Processed (603) - PNRP14_B.7.19.56_T192_SLIDE4_PIC4.jpg
Processed (604) - PNRP14_B.5.15_T22_SLIDE7_PIC3.jpg
Processed (605) - PNRP12_B.5.15_T262_SLIDE2_PIC4.jpg
Processed (606) - PNRP14_B.5.35_T73_SLIDE5_PIC2.jpg
Processed (607) - PNRP12_B.5.15_T262_SLIDE3_PIC4.jpg
Processed (608) - PNRP14_B.5.35_T73_SLIDE4_PIC2.jpg
Processed (609) - PNRP14_B.5.35.27_T281_SLIDE2_PIC3.jpg
Processed (610) - PNRP14_B.5.35.27_T281_SLIDE3_PIC3.jpg
Processed (611) - PNRP14_B.7.27_T210_SLIDE1_PIC14.jpg
Processed (612) - PNRP14_B.5.35_T93_SLIDE3_PIC2.jpg
Processed (613) - PNRP14_B.5.4_T113_SLIDE6_PIC1.jpg
Processed (614) - PNRP14_B.5.35_T59_SLIDE3_PIC1.jpg
Processed (615) - PNRP14_B.5.35_T59_SLIDE2_PIC1.jpg
Processed (616) - PNRP12_B.4.22_T10_SLIDE2_PIC5.jpg
Processed (617) - PNRP14_B.5.32.115_T33_SLIDE3_PIC2.jpg
Processed (618) - PNRP14_B.7.34_T245_SLIDE3_PIC8.jpg
Processed (619) - PNRP12_B.4.22_T10_SLIDE3_PIC5.jpg
Processed (620) - PNRP14_B.5.35_T105_SLIDE3_PIC1.jpg
Processed (621) - PNRP14_B.5.35_T105_SLIDE2_PIC1.jpg
Processed (622) - PNRP14_B.7.33_T228_SLIDE3_PIC2.jpg
Processed (623) - PNRP14_B.7.33_T228_SLIDE2_PIC2.jpg
Processed (624) - PNRP14_B.7.19.56_T194_SLIDE2_PIC2.jpg
Processed (625) - PNRP14_B.7.34_T248_SLIDE2_PIC2.jpg
Processed (626) - PNRP14_B.7.19.56_T194_SLIDE3_PIC2.jpg
Processed (627) - PNRP12_B.5.15_T26_SLIDE2_PIC1.jpg
Processed (628) - PNRP12_B.5.15_T26_SLIDE3_PIC1.jpg
Processed (629) - PNRP14_B.6.42_T276_SLIDE2_PIC3.jpg
Processed (630) - PNRP14_B.5.35_T85_SLIDE3_PIC1.jpg
Processed (631) - PNRP14_B.5.35_T85_SLIDE2_PIC1.jpg
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Processed (632) - PNRP14_B.7.33_T232_SLIDE1_PIC1.jpg
Processed (633) - PNRP14_B.7.20_T202_SLIDE2_PIC1.jpg
Processed (634) - PNRP14_B.5.34_T59_SLIDE3_PIC1.jpg
Processed (635) - PNRP14_B.6.42_T276_SLIDE2_PIC2.jpg
Processed (636) - PNRP14_B.7.34_T248_SLIDE2_PIC3.jpg
Processed (637) - PNRP14_B.7.19.56_T194_SLIDE3_PIC3.jpg
Processed (638) - PNRP14_B.7.19.56_T194_SLIDE2_PIC3.jpg
Processed (639) - PNRP14_B.7.33_T228_SLIDE2_PIC3.jpg
Processed (640) - PNRP14_B.6.44_T165_SLIDE4_PIC1.jpg
Processed (641) - PNRP12_B.5.17_T29_SLIDE2_PIC1.jpg
Processed (642) - PNRP12_B.4.22_T10_SLIDE3_PIC4.jpg
Processed (643) - PNRP14_B.5.32.115_T33_SLIDE3_PIC3.jpg
Processed (644) - PNRP12_B.4.22_T10_SLIDE2_PIC4.jpg
Processed (645) - PNRP14_B.7.31_T219_SLIDE2_PIC1.jpg
Processed (646) - PNRP14_B.7.31_T219_SLIDE3_PIC1.jpg
Processed (647) - PNRP14_B.6.44_T164_SLIDE3_PIC1.jpg
Processed (648) - PNRP14_B.7.27_T210_SLIDE1_PIC15.jpg
Processed (649) - PNRP14_B.7.34_T247_SLIDE3_PIC1.jpg
Processed (650) - PNRP14_B.7.34_T247_SLIDE2_PIC1.jpg
Processed (651) - PNRP14_B.5.35_T110_SLIDE1_PIC1.jpg
Processed (652) - PNRP12_B.5.31_T259_SLIDE3_PIC2.jpg
Processed (653) - PNRP14_B.5.35_T73_SLIDE5_PIC3.jpg
Processed (654) - PNRP14_B.5.35_T90_SLIDE1_PIC1.jpg
Processed (655) - PNRP14_B.5.15_T22_SLIDE7_PIC2.jpg
Processed (656) - PNRP14_B.6.43_T152_SLIDE2_PIC2.jpg
Processed (657) - TOMB2_BURIAL4_T257_SLIDE4_PIC3.jpg
Processed (658) - PNRP12_B.5.15_T262_SLIDE2_PIC1.jpg
Processed (659) - PNRP12_B.5.15_T262_SLIDE3_PIC1.jpg
Processed (660) - PNRP12_B.5.15_T23_SLIDE6_PIC2.jpg
Processed (661) - PNRP12_B.4.17_T282_SLIDE4_PIC2.jpg
Processed (662) - PNRP12_B.6.10.35_T135_SLIDE3_PIC3.jpg
Processed (663) - PNRP14_B.6.34_T143_SLIDE4_PIC2.jpg
Processed (664) - PNRP12_B.6.10.35_T135_SLIDE2_PIC3.jpg
Processed (665) - PNRP12_B.5.15_T23_SLIDE7_PIC2.jpg
Processed (666) - PNRP14_B.5.34_T51_SLIDE2_PIC3.jpg
Processed (667) - PNRP14_B.6.44_T165_SLIDE5_PIC11.jpg
Processed (668) - PNRP14_B.5.34_T51_SLIDE3_PIC3.jpg
Processed (669) - PNRP14_B.7.31_T272_SLIDE3_PIC2.jpg
Processed (670) - PNRP14_B.5.35_T59_SLIDE2_PIC4.jpg
Processed (671) - PNRP14_B.6.37_T147_SLIDE3_PIC3.jpg
Processed (672) - PNRP14_B.7.31_T222_SLIDE4_PIC1.jpg
Processed (673) - PNRP14_B.6.37_T147_SLIDE2_PIC3.jpg
Processed (674) - PNRP14_B.7.31_T222_SLIDE5_PIC1.jpg
Processed (675) - PNRP14_B.6.44_T165_SLIDE4_PIC5.jpg
Processed (676) - PNRP14_B.6.44_T165_SLIDE5_PIC5.jpg
Processed (677) - PNRP12_B.5.17_T29_SLIDE3_PIC5.jpg
Processed (678) - PNRP12_B.4.23_T12_SLIDE7_PIC3.jpg
Processed (679) - TOMB2_COMMINGLED_T251_SLIDE1_PIC1.jpg
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Processed (680) - PNRP14_B.7.27_T210_SLIDE2_PIC3.jpg
Processed (681) - PNRP14_B.7.19.56_T194_SLIDE2_PIC7.jpg
Processed (682) - PNRP14_B.5.35_T85_SLIDE3_PIC4.jpg
Processed (683) - PNRP14_B.7.33_T232_SLIDE1_PIC4.jpg
Processed (684) - PNRP14_B.5.35_T85_SLIDE2_PIC4.jpg
Processed (685) - PNRP12_B.5.15_T26_SLIDE3_PIC4.jpg
Processed (686) - PNRP14_B.7.20_T205_SLIDE2_PIC1.jpg
Processed (687) - PNRP14_B.7.33_T235_SLIDE1_PIC1.jpg
Processed (688) - PNRP14_B.5.35_T85_SLIDE2_PIC5.jpg
Processed (689) - PNRP14_B.5.34_T59_SLIDE3_PIC4.jpg
Processed (690) - PNRP14_B.7.19.56_T194_SLIDE2_PIC6.jpg
Processed (691) - PNRP14_B.7.27_T210_SLIDE2_PIC2.jpg
Processed (692) - PNRP12_B.4.23_T12_SLIDE7_PIC2.jpg
Processed (693) - PNRP12_B.5.17_T29_SLIDE3_PIC4.jpg
Processed (694) - PNRP12_B.4.22_T10_SLIDE3_PIC1.jpg
Processed (695) - PNRP12_B.4.22_T10_SLIDE2_PIC1.jpg
Processed (696) - PNRP14_B.6.37_T147_SLIDE2_PIC2.jpg
Processed (697) - PNRP14_B.6.37_T147_SLIDE3_PIC2.jpg
Processed (698) - PNRP14_B.6.44_T164_SLIDE3_PIC4.jpg
Processed (699) - PNRP14_B.7.19.57_T194_SLIDE5_PIC3.jpg
Processed (700) - PNRP14_B.6.28_T132_SLIDE1_PIC4.jpg
Processed (701) - PNRP14_B.5.34_T51_SLIDE3_PIC2.jpg
Processed (702) - PNRP14_B.7.31_T219_SLIDE2_PIC4.jpg
Processed (703) - PNRP14_B.5.34_T51_SLIDE2_PIC2.jpg
Processed (704) - PNRP14_B.6.44_T165_SLIDE5_PIC10.jpg
Processed (705) - PNRP14_B.7.27_T211_SLIDE4_PIC2.jpg
Processed (706) - PNRP14_B.6.34_T143_SLIDE4_PIC3.jpg
Processed (707) - PNRP14_B.7.32_T226_SLIDE3_PIC1.jpg
Processed (708) - PNRP12_B.5.15_T23_SLIDE7_PIC3.jpg
Processed (709) - PNRP12_B.6.10.35_T135_SLIDE2_PIC2.jpg
Processed (710) - PNRP12_B.4.17_T282_SLIDE4_PIC3.jpg
Processed (711) - PNRP12_B.6.10.35_T135_SLIDE3_PIC2.jpg
Processed (712) - PNRP14_B.7.32_T226_SLIDE2_PIC1.jpg
Processed (713) - PNRP14_B.6.43_T151_SLIDE1_PIC1.jpg
Processed (714) - PNRP14_B.5.35_T94_SLIDE3_PIC2.jpg
Processed (715) - PNRP12_B.4.22_T11_SLIDE5_PIC1.jpg
Processed (716) - TOMB2_BURIAL4_T257_SLIDE4_PIC2.jpg
Processed (717) - PNRP14_B.6.43_T152_SLIDE2_PIC3.jpg
Processed (718) - PNRP14_B.6.38_T275_SLIDE4_PIC2.jpg
Processed (719) - PNRP14_B.7.19.56_T192_SLIDE4_PIC2.jpg
Processed (720) - PNRP14_B.6.43_T152_SLIDE2_PIC1.jpg
Processed (721) - PNRP14_B.6.43_T152_SLIDE3_PIC1.jpg
Processed (722) - PNRP12_B.5.15_T262_SLIDE3_PIC2.jpg
Processed (723) - PNRP12_B.5.15_T262_SLIDE2_PIC2.jpg
Processed (724) - PNRP14_B.7.27_T210_SLIDE1_PIC12.jpg
Processed (725) - PNRP12_B.5.15_T23_SLIDE7_PIC1.jpg
Processed (726) - PNRP14_B.7.32_T226_SLIDE3_PIC3.jpg
Processed (727) - PNRP14_B.6.34_T143_SLIDE4_PIC1.jpg
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Processed (728) - PNRP12_B.5.15_T23_SLIDE6_PIC1.jpg
Processed (729) - PNRP12_B.4.17_T282_SLIDE4_PIC1.jpg
Processed (730) - PNRP14_B.6.44_T165_SLIDE5_PIC12.jpg
Processed (731) - PNRP14_B.6.31_T141_SLIDE1_PIC2.jpg
Processed (732) - PNRP14_B.7.19.57_T194_SLIDE4_PIC1.jpg
Processed (733) - PNRP14_B.7.19.57_T194_SLIDE5_PIC1.jpg
Processed (734) - PNRP14_B.6.44_T164_SLIDE3_PIC6.jpg
Processed (735) - PNRP14_B.7.31_T222_SLIDE5_PIC2.jpg
Processed (736) - PNRP12_B.4.22_T10_SLIDE3_PIC3.jpg
Processed (737) - PNRP12_B.4.22_T10_SLIDE2_PIC3.jpg
Processed (738) - TOMB2_COMMINGLED_T251_SLIDE1_PIC2.jpg
Processed (739) - PNRP12_B.5.17_T29_SLIDE3_PIC6.jpg
Processed (740) - PNRP14_B.7.19.56_T194_SLIDE3_PIC4.jpg
Processed (741) - PNRP14_B.7.19.56_T194_SLIDE2_PIC4.jpg
Processed (742) - PNRP12_B.4.22_T10_SLIDE6_PIC9.jpg
Processed (743) - PNRP14_B.7.33_T235_SLIDE1_PIC3.jpg
Processed (744) - PNRP14_B.7.33_T235_SLIDE1_PIC2.jpg
Processed (745) - PNRP12_B.4.22_T10_SLIDE6_PIC8.jpg
Processed (746) - PNRP14_B.7.19.56_T194_SLIDE2_PIC5.jpg
Processed (747) - PNRP12_B.4.23_T12_SLIDE6_PIC1.jpg
Processed (748) - PNRP14_B.7.27_T210_SLIDE2_PIC1.jpg
Processed (749) - PNRP12_B.4.23_T12_SLIDE7_PIC1.jpg
Processed (750) - PNRP14_B.6.44_T165_SLIDE5_PIC7.jpg
Processed (751) - PNRP12_B.4.22_T10_SLIDE2_PIC2.jpg
Processed (752) - PNRP12_B.4.22_T10_SLIDE3_PIC2.jpg
Processed (753) - PNRP14_B.6.37_T147_SLIDE3_PIC1.jpg
Processed (754) - PNRP14_B.5.34_T51_SLIDE2_PIC1.jpg
Processed (755) - PNRP14_B.7.27_T211_SLIDE4_PIC1.jpg
Processed (756) - PNRP14_B.5.34_T51_SLIDE3_PIC1.jpg
Processed (757) - PNRP12_B.6.10.35_T135_SLIDE3_PIC1.jpg
Processed (758) - PNRP14_B.7.32_T226_SLIDE3_PIC2.jpg
Processed (759) - PNRP14_B.7.27_T210_SLIDE1_PIC13.jpg
Processed (760) - PNRP12_B.6.10.35_T135_SLIDE2_PIC1.jpg
Processed (761) - PNRP14_B.5.35_T94_SLIDE3_PIC1.jpg
Processed (762) - PNRP12_B.5.15_T262_SLIDE2_PIC3.jpg
Processed (763) - TOMB2_BURIAL4_T257_SLIDE4_PIC1.jpg
Processed (764) - PNRP12_B.5.15_T262_SLIDE3_PIC3.jpg
Processed (765) - TOMB2_BURIAL4_T257_SLIDE5_PIC1.jpg
Processed (766) - PNRP14_B.6.38_T275_SLIDE4_PIC1.jpg
Processed (767) - PNRP14_B.5.35_T79_SLIDE1_PIC1.jpg
Processed (768) - PNRP14_B.7.19.56_T192_SLIDE4_PIC1.jpg
```

8 Function to create CSV file with image and number of annulations

```
[3]: import os
     import csv

     data = [
         ["File Name", "Actual Annulations"]
     ]

     directory = "./Training Folder/"

     for dirpath, dirnames, files in os.walk(directory):
         if not dirnames:
             cementum_counts = int(dirpath.split(" ")[-1])
             for file in files:
                 csv_row = [file, cementum_counts]
                 data.append(csv_row)

     filename = "image_annulation.csv"

     with open(filename, 'w', newline='') as csvfile:
         csvwriter = csv.writer(csvfile)
         csvwriter.writerows(data)

     print(f"CSV file '{filename}' created successfully.")
```

```
CSV file 'image_annulation.csv' created successfully.
```

9 Model with only redone images, data augmentation, resized images to (500,500), and early stopping

```
[3]: import os
     import cv2
     import numpy as np
     import pandas as pd
     from sklearn.model_selection import train_test_split
     import tensorflow as tf
     from tensorflow.keras.models import Sequential
     from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense,
       ↪Dropout, BatchNormalization
     from tensorflow.keras.preprocessing.image import ImageDataGenerator
     from tensorflow.keras.callbacks import EarlyStopping, ReduceLROnPlateau
     from sklearn.metrics import mean_squared_error, mean_absolute_percentage_error

     csv_info = './image_annulation.csv'
```

```python
df = pd.read_csv(csv_info)

filename_to_count = dict(zip(df['File'], df['Number of Annulations']))

directory = './Flattened Images with Only Redone/'

target_size = (500, 500)

images = []
counts = []

for dirpath, dirnames, files in os.walk(directory):
    for file in files:
        if file in filename_to_count:
                path = os.path.join(dirpath, file)
                image = cv2.imread(path, cv2.IMREAD_COLOR)
                resized_image = cv2.resize(image, target_size)
                blurred_image = cv2.GaussianBlur(resized_image, (5, 5), 0)
                equalized_image = cv2.merge([
                    cv2.equalizeHist(blurred_image[:, :, 0]),
                    cv2.equalizeHist(blurred_image[:, :, 1]),
                    cv2.equalizeHist(blurred_image[:, :, 2])
                ])

                images.append(resized_image)
                counts.append(filename_to_count[file])

X = np.array(images)
y = np.array(counts)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
 ↪random_state=42)

early_stopping = EarlyStopping(monitor='val_mae', patience=5,
 ↪restore_best_weights=True)

datagen = ImageDataGenerator(
    rescale=1./255,
    rotation_range=20,
    width_shift_range=0.2,
    height_shift_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    brightness_range=[0.8, 1.2]
)

model = Sequential([
```

```python
    Conv2D(32, (3, 3), activation='relu', input_shape=(500, 500, 3)),
    MaxPooling2D((2, 2)),
    Conv2D(64, (3, 3), activation='relu'),
    MaxPooling2D((2, 2)),
    Flatten(),
    Dense(128, activation='relu'),
    Dense(1, activation='linear')
])

model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mae'])

model.fit(X_train, y_train, epochs=25, validation_split=0.2,␣
 ↪callbacks=[early_stopping])

test_loss, test_mae = model.evaluate(X_test, y_test)
print("Test MAE:", test_mae)

model.save('./model-only-redone-images.h5')
```

/Users/sergioguerra/anaconda3/lib/python3.11/site-
packages/keras/src/layers/convolutional/base_conv.py:107: UserWarning: Do not
pass an `input_shape`/`input_dim` argument to a layer. When using Sequential
models, prefer using an `Input(shape)` object as the first layer in the model
instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)

Epoch 1/25
19/19   50s 3s/step - loss:
255046224.0000 - mae: 7553.1694 - val_loss: 51951.2656 - val_mae: 226.1686
Epoch 2/25
19/19   50s 3s/step - loss:
27711.4844 - mae: 144.6861 - val_loss: 1721.8029 - val_mae: 39.0944
Epoch 3/25
19/19   53s 3s/step - loss:
1487.0386 - mae: 32.6333 - val_loss: 206.7856 - val_mae: 12.0920
Epoch 4/25
19/19   42s 2s/step - loss:
371.1442 - mae: 15.5812 - val_loss: 258.1730 - val_mae: 13.4116
Epoch 5/25
19/19   43s 2s/step - loss:
206.4132 - mae: 12.0924 - val_loss: 202.2568 - val_mae: 11.9912
Epoch 6/25
19/19   43s 2s/step - loss:
175.3393 - mae: 11.0531 - val_loss: 227.9288 - val_mae: 12.6901
Epoch 7/25
19/19   42s 2s/step - loss:
173.6845 - mae: 10.7486 - val_loss: 191.6933 - val_mae: 11.6185
Epoch 8/25

```
19/19              42s 2s/step - loss:
165.2209 - mae: 10.2293 - val_loss: 191.3003 - val_mae: 11.5946
Epoch 9/25
19/19              82s 4s/step - loss:
164.4425 - mae: 10.3633 - val_loss: 187.0726 - val_mae: 11.4393
Epoch 10/25
19/19              48s 2s/step - loss:
153.1239 - mae: 10.0261 - val_loss: 187.2181 - val_mae: 11.4434
Epoch 11/25
19/19              54s 3s/step - loss:
146.7666 - mae: 9.7260 - val_loss: 194.8488 - val_mae: 11.6698
Epoch 12/25
19/19              45s 2s/step - loss:
129.5013 - mae: 9.2456 - val_loss: 187.5862 - val_mae: 11.4353
Epoch 13/25
19/19              45s 2s/step - loss:
127.4395 - mae: 9.0938 - val_loss: 184.7598 - val_mae: 11.3015
Epoch 14/25
19/19              43s 2s/step - loss:
123.4000 - mae: 8.8957 - val_loss: 183.3869 - val_mae: 11.2633
Epoch 15/25
19/19              43s 2s/step - loss:
126.8503 - mae: 8.8893 - val_loss: 202.5590 - val_mae: 11.8913
Epoch 16/25
19/19              512s 28s/step -
loss: 125.1838 - mae: 9.0108 - val_loss: 182.9198 - val_mae: 11.2578
Epoch 17/25
19/19              47s 2s/step - loss:
113.5212 - mae: 8.5466 - val_loss: 181.0787 - val_mae: 11.1798
Epoch 18/25
19/19              49s 3s/step - loss:
107.9533 - mae: 8.1340 - val_loss: 183.4140 - val_mae: 11.2613
Epoch 19/25
19/19              51s 3s/step - loss:
102.9701 - mae: 8.0961 - val_loss: 195.3055 - val_mae: 11.6485
Epoch 20/25
19/19              54s 3s/step - loss:
101.2493 - mae: 8.0226 - val_loss: 181.4597 - val_mae: 11.1812
Epoch 21/25
19/19              48s 3s/step - loss:
92.0730 - mae: 7.4297 - val_loss: 184.3596 - val_mae: 11.2935
Epoch 22/25
19/19              45s 2s/step - loss:
90.1938 - mae: 7.5268 - val_loss: 180.7502 - val_mae: 11.1198
Epoch 23/25
19/19              47s 2s/step - loss:
96.9042 - mae: 7.4894 - val_loss: 179.8676 - val_mae: 11.0989
Epoch 24/25
```

```
19/19                47s 2s/step - loss:
89.6748 - mae: 7.2118 - val_loss: 180.4641 - val_mae: 11.1334
Epoch 25/25
19/19                47s 2s/step - loss:
82.9686 - mae: 6.9016 - val_loss: 181.5333 - val_mae: 11.1678
6/6              2s 410ms/step - loss:
186.6334 - mae: 11.0031
```

```
WARNING:absl:You are saving your model as an HDF5 file via `model.save()` or
`keras.saving.save_model(model)`. This file format is considered legacy. We
recommend using instead the native Keras format, e.g.
`model.save('my_model.keras')` or `keras.saving.save_model(model,
'my_model.keras')`.
```

```
Test MAE: 10.903106689453125
```

This model is the one that was used for the applications built. It employs early stopping, which is a way to monitor if the model is getting better or not with each epoch. It waits a specified number of epochs for the model to improve with the validation data. If it does not, it will stop progressing and return to the best settings for the best model.

10 Model with Region Identifiable - 70% Confident

```python
[7]: import os
     import cv2
     import numpy as np
     import pandas as pd
     from sklearn.model_selection import train_test_split
     import tensorflow as tf
     from tensorflow.keras.models import Sequential
     from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense,␣
      ↪Dropout, BatchNormalization
     from tensorflow.keras.preprocessing.image import ImageDataGenerator
     from tensorflow.keras.callbacks import EarlyStopping, ReduceLROnPlateau
     from sklearn.metrics import mean_squared_error, mean_absolute_percentage_error

     csv_info = './image_annulation.csv'
     df = pd.read_csv(csv_info)

     filename_to_count = dict(zip(df['File'], df['Number of Annulations']))

     directory = './Identified Annulation Region - 70 percent confident/'

     target_size = (600, 600)

     images = []
     counts = []
```

```python
for dirpath, dirnames, files in os.walk(directory):
    for file in files:
        if file in filename_to_count:
                path = os.path.join(dirpath, file)
                image = cv2.imread(path, cv2.IMREAD_COLOR)
                resized_image = cv2.resize(image, target_size)
                blurred_image = cv2.GaussianBlur(resized_image, (5, 5), 0)
                equalized_image = cv2.merge([
                    cv2.equalizeHist(blurred_image[:, :, 0]),
                    cv2.equalizeHist(blurred_image[:, :, 1]),
                    cv2.equalizeHist(blurred_image[:, :, 2])
                ])

                images.append(resized_image)
                counts.append(filename_to_count[file])

X = np.array(images)
y = np.array(counts)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
 ↪random_state=42)

early_stopping = EarlyStopping(monitor='val_mae', patience=10,
 ↪restore_best_weights=True)

model = Sequential([
    Conv2D(32, (3, 3), activation='relu', input_shape=(600, 600, 3)),
    MaxPooling2D((2, 2)),
    Conv2D(64, (3, 3), activation='relu'),
    MaxPooling2D((2, 2)),
    Flatten(),
    Dense(128, activation='relu'),
    Dense(1, activation='linear')
])

model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mae'])

model.fit(X_train, y_train, epochs=50, validation_split=0.2,
 ↪callbacks=[early_stopping])

test_loss, test_mae = model.evaluate(X_test, y_test)
print("Test MAE:", test_mae)
```

/Users/sergioguerra/anaconda3/lib/python3.11/site-
packages/keras/src/layers/convolutional/base_conv.py:107: UserWarning: Do not
pass an `input_shape`/`input_dim` argument to a layer. When using Sequential
models, prefer using an `Input(shape)` object as the first layer in the model

```
instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)

Epoch 1/50
16/16            66s 4s/step - loss:
1672187136.0000 - mae: 19988.0020 - val_loss: 381714.8750 - val_mae: 605.6277
Epoch 2/50
16/16            61s 4s/step - loss:
279170.2188 - mae: 472.1573 - val_loss: 62312.8203 - val_mae: 247.6470
Epoch 3/50
16/16            63s 4s/step - loss:
48397.5156 - mae: 195.6571 - val_loss: 11520.8135 - val_mae: 104.0881
Epoch 4/50
16/16            65s 4s/step - loss:
7808.0767 - mae: 74.8265 - val_loss: 2516.3037 - val_mae: 46.6569
Epoch 5/50
16/16            67s 4s/step - loss:
1691.2031 - mae: 35.6881 - val_loss: 359.2148 - val_mae: 15.5476
Epoch 6/50
16/16            67s 4s/step - loss:
394.9589 - mae: 15.8382 - val_loss: 399.5191 - val_mae: 16.0602
Epoch 7/50
16/16            62s 4s/step - loss:
250.9165 - mae: 12.7453 - val_loss: 242.9042 - val_mae: 12.3643
Epoch 8/50
16/16            61s 4s/step - loss:
190.3752 - mae: 11.3041 - val_loss: 223.5024 - val_mae: 12.0872
Epoch 9/50
16/16            64s 4s/step - loss:
173.1606 - mae: 10.9011 - val_loss: 230.7895 - val_mae: 12.1192
Epoch 10/50
16/16            63s 4s/step - loss:
145.2777 - mae: 9.7724 - val_loss: 253.2227 - val_mae: 12.5697
Epoch 11/50
16/16            61s 4s/step - loss:
144.2104 - mae: 10.0577 - val_loss: 227.6503 - val_mae: 12.0305
Epoch 12/50
16/16            64s 4s/step - loss:
136.7101 - mae: 9.6311 - val_loss: 251.4252 - val_mae: 12.4512
Epoch 13/50
16/16            64s 4s/step - loss:
142.6530 - mae: 9.7035 - val_loss: 226.5229 - val_mae: 11.9622
Epoch 14/50
16/16            62s 4s/step - loss:
125.0864 - mae: 8.9656 - val_loss: 273.7674 - val_mae: 12.9033
Epoch 15/50
16/16            60s 4s/step - loss:
130.8982 - mae: 9.3363 - val_loss: 225.5979 - val_mae: 12.2636
```

```
Epoch 16/50
16/16              66s 4s/step - loss:
119.2557 - mae: 8.7168 - val_loss: 273.2260 - val_mae: 12.8779
Epoch 17/50
16/16              454s 30s/step -
loss: 109.2253 - mae: 8.2765 - val_loss: 222.8954 - val_mae: 12.1663
Epoch 18/50
16/16              355s 23s/step -
loss: 123.3685 - mae: 8.7000 - val_loss: 224.9800 - val_mae: 11.9628
Epoch 19/50
16/16              1075s 71s/step -
loss: 93.9699 - mae: 7.7196 - val_loss: 231.2198 - val_mae: 11.9746
Epoch 20/50
16/16              75s 5s/step - loss:
89.0702 - mae: 7.5890 - val_loss: 236.8330 - val_mae: 12.2056
Epoch 21/50
16/16              86s 5s/step - loss:
80.8889 - mae: 7.0421 - val_loss: 226.5878 - val_mae: 11.9503
Epoch 22/50
16/16              95s 6s/step - loss:
81.0010 - mae: 7.1490 - val_loss: 227.2604 - val_mae: 11.9621
Epoch 23/50
16/16              102s 6s/step -
loss: 71.2503 - mae: 6.5757 - val_loss: 234.1020 - val_mae: 12.0292
Epoch 24/50
16/16              103s 6s/step -
loss: 69.6061 - mae: 6.4177 - val_loss: 242.6953 - val_mae: 12.2671
Epoch 25/50
16/16              106s 7s/step -
loss: 64.7559 - mae: 6.2093 - val_loss: 232.2277 - val_mae: 12.0063
Epoch 26/50
16/16              105s 7s/step -
loss: 65.4612 - mae: 6.3040 - val_loss: 255.9991 - val_mae: 12.4857
Epoch 27/50
16/16              108s 7s/step -
loss: 61.0298 - mae: 5.9512 - val_loss: 232.3340 - val_mae: 11.9548
Epoch 28/50
16/16              108s 7s/step -
loss: 63.3540 - mae: 6.0158 - val_loss: 235.9398 - val_mae: 12.0517
Epoch 29/50
16/16              113s 7s/step -
loss: 56.1860 - mae: 5.6230 - val_loss: 234.3460 - val_mae: 11.9599
Epoch 30/50
16/16              115s 7s/step -
loss: 52.7558 - mae: 5.6619 - val_loss: 236.9253 - val_mae: 12.0481
Epoch 31/50
16/16              111s 7s/step -
loss: 48.9539 - mae: 5.3332 - val_loss: 235.8056 - val_mae: 11.9872
```

```
5/5              6s 1s/step - loss:
163.7083 - mae: 10.7733
Test MAE: 11.079846382141113
```

11 Notes

- First run of only using annulation regions that were identifiable at 80% confidence - Test MAE of 12.06 (Not good)

- Second run using Early Stopping, normalizing pixel values, etc - Using Early Stopping yieled a Test MAE of 126.1 (Terrible)

- First run of only using annulation regions that were identifiable at 90% confidence - Test MAE of 23.08 (Not great but adding in reduce_lr)

- Second run using reduce_lr led to terrible results - Test MAE of 490.2

- Third run using equalized image and removing reduce_lr - Test MAE of 310.25

- Fourth run increasing image size to 500,500 and going back to resized image - Test MAE of 184.16

- Run with images with annulation region identified 70%. Early Stopping 10 epoch with returning best weight. Reached 31/50 Epoch with test MAE of 11.07. Image dimensions are 600,600.

12 Cropping the area around an image using prediction

```python
[151]: import os
       import supervision as sv
       from inference import get_model
       from PIL import Image
       import json

       model = get_model(model_id="annulation-region-detection/1", api_key="your key")

       directory = "./Flattened Images with Only Redone (RoboFlow)/"

       bounding_box_annotator = sv.BoxAnnotator()

       count = 0

       for dirpath, dirnames, files in os.walk(directory):
           for file in files:
               if file.lower().endswith(('.png', '.jpg', '.jpeg')):
                   path = os.path.join(dirpath, file)
                   image = Image.open(path)
                   results = model.infer(image=path)[0]
                   predictions_json = results.json()
```

```python
            predictions = json.loads(predictions_json)["predictions"]
            detections = sv.Detections.from_inference(results)

            confidence_threshold = 0.7

            if len(predictions) > 0 and predictions[0]["confidence"] >␣
↪confidence_threshold:
                # Get the bounding box coordinates
                x1, y1, x2, y2 = detections.xyxy[0].astype(int)

                # Crop the image
                cropped_image = image.crop((x1, y1, x2, y2))

                # Save the cropped image
                cropped_image.save(os.path.join("./Inference Crop 70 Percent/",␣
↪file))

                count += 1
                print("Processed (" + str(count) + ") - " + file)
```

```
UserWarning: Specified provider 'CUDAExecutionProvider' is not in available
provider names.Available providers: 'CPUExecutionProvider'
UserWarning: Specified provider 'OpenVINOExecutionProvider' is not in available
provider names.Available providers: 'CPUExecutionProvider'

Processed (1) - TOMB2_COMMINGLED_T250_SLIDE2_PIC4.jpg
Processed (2) - PNRP14_B.5.35_T93_SLIDE6_PIC2.jpg
Processed (3) - PNRP14_B.6.36_T144_SLIDE2_PIC1.jpg
Processed (4) - PNRP14_B.5.34_SKULL9_T46_SLIDE3_PIC1.jpg
Processed (5) - PNRP14_B.5.34_SKULL9_T46_SLIDE2_PIC1.jpg
Processed (6) - PNRP14_B.5.35_T97_SLIDE4_PIC4.jpg
Processed (7) - PNRP14_B.7.19.56_T195_SLIDE1_PIC2.jpg
Processed (8) - PNRP14_B.6.44_T167_SLIDE5_PIC2.jpg
Processed (9) - PNRP12_B.6.5.18_T189_SLIDE4_PIC4.jpg
Processed (10) - PNRP12_B.4.17_T6_SLIDE2_PIC3.jpg
Processed (11) - PNRP12_B.4.22_T10_2_SLIDE6_PIC1.jpg
Processed (12) - PNRP12_B.6.5.18_T189_SLIDE5_PIC4.jpg
Processed (13) - PNRP12_B.4.17_T6_SLIDE3_PIC3.jpg
Processed (14) - PNRP14_B.7.34_T245_SLIDE2_PIC2.jpg
Processed (15) - PNRP14_B.7.33_T232_SLIDE4_PIC1.jpg
Processed (16) - PNRP14_B.6.44_T166_SLIDE3_PIC2.jpg
Processed (17) - PNRP12_B.4.10_T2_SLIDE3_PIC2.jpg
Processed (18) - PNRP14_B.6.44_T166_SLIDE2_PIC2.jpg
Processed (19) - PNRP12_B.4.17_T8_SLIDE4_PIC1.jpg
Processed (20) - PNRP14_B.7.33_T274_SLIDE2_PIC1.jpg
Processed (21) - PNRP14_B.6.32_T142_SLIDE3_PIC1.jpg
Processed (22) - PNRP14_B.6.32_T142_SLIDE2_PIC1.jpg
Processed (23) - PNRP12_B.5.15_T267_SLIDE2_PIC2.jpg
```

```
Processed (24) - PNRP12_B.4.22_T10_SLIDE6_PIC5.jpg
Processed (25) - PNRP12_B.4.22_T10_SLIDE7_PIC5.jpg
Processed (26) - PNRP16_F.1.28.115.S34_T298_SLIDE1_PIC2.jpg
Processed (27) - PNRP16_F.1.28.115.S34_T298_SLIDE1_PIC3.jpg
Processed (28) - PNRP12_B.4.22_T10_SLIDE7_PIC4.jpg
Processed (29) - PNRP12_B.5.15_T267_SLIDE2_PIC3.jpg
Processed (30) - PNRP12_B.4.22_T10_SLIDE6_PIC4.jpg
Processed (31) - PNRP14_B.6.44_T165_SLIDE1_PIC1.jpg
Processed (32) - PNRP12_B.4.10_T1_SLIDE1_PIC1.jpg
Processed (33) - PNRP12_B.4.10_T2_SLIDE3_PIC3.jpg
Processed (34) - PNRP14_B.6.44_T166_SLIDE2_PIC3.jpg
Processed (35) - PNRP14_B.6.44_T166_SLIDE3_PIC3.jpg
Processed (36) - PNRP14_B.5.35.17_T72_SLIDE2_PIC1.jpg
Processed (37) - PNRP12_B.4.17_T6_SLIDE3_PIC2.jpg
Processed (38) - PNRP12_B.6.5.18_T189_SLIDE4_PIC5.jpg
Processed (39) - PNRP12_B.4.17_T6_SLIDE2_PIC2.jpg
Processed (40) - PNRP14_B.7.19.56_T195_SLIDE1_PIC3.jpg
Processed (41) - PNRP14_B.5.35_T90_SLIDE4_PIC1.jpg
Processed (42) - PNRP14_B.5.35_T90_SLIDE5_PIC1.jpg
Processed (43) - TOMB2_BURIAL6_T258_PIC4.jpg
Processed (44) - PNRP12_B.4.22_T10_SLIDE2_PIC10.jpg
Processed (45) - PNRP14_B.6.44_T154_SLIDE3_PIC1.jpg
Processed (46) - PNRP14_B.6.44_T154_SLIDE2_PIC3.jpg
Processed (47) - PNRP14_B.6.6_T183_SLIDE3_PIC1.jpg
Processed (48) - PNRP14_B.5.35_T99_SLIDE2_PIC5.jpg
Processed (49) - PNRP14_B.5.35_T93_SLIDE6_PIC1.jpg
Processed (50) - PNRP14_B.6.36_T144_SLIDE3_PIC2.jpg
Processed (51) - PNRP16_F.1.28.115.35_T320_SLIDE2_PIC2.jpg
Processed (52) - PNRP14_B.5.35_T90_SLIDE5_PIC3.jpg
Processed (53) - PNRP14_B.5.34_SKULL9_T46_SLIDE3_PIC2.jpg
Processed (54) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC4.jpg
Processed (55) - PNRP14_B.6.44_T167_SLIDE5_PIC1.jpg
Processed (56) - PNRP14_B.7.19.56_T195_SLIDE1_PIC1.jpg
Processed (57) - PNRP12_B.4.22_T10_2_SLIDE6_PIC2.jpg
Processed (58) - PNRP14_B.7.19.56_T199_SLIDE2_PIC1.jpg
Processed (59) - PNRP14_B.7.33_T232_SLIDE5_PIC2.jpg
Processed (60) - PNRP14_B.7.19.56_T199_SLIDE3_PIC1.jpg
Processed (61) - PNRP14_B.7.34_T245_SLIDE2_PIC1.jpg
Processed (62) - PNRP14_B.7.33_T232_SLIDE4_PIC2.jpg
Processed (63) - PNRP14_B.6.44_T165_SLIDE5_PIC9.jpg
Processed (64) - PNRP14_B.6.44_T166_SLIDE2_PIC1.jpg
Processed (65) - PNRP12_B.4.10_T2_SLIDE3_PIC1.jpg
Processed (66) - PNRP14_B.6.44_T166_SLIDE3_PIC1.jpg
Processed (67) - PNRP12_B.4.17_T8_SLIDE4_PIC2.jpg
Processed (68) - PNRP14_B.7.33_T274_SLIDE3_PIC2.jpg
Processed (69) - PNRP14_B.6.44_T165_SLIDE1_PIC3.jpg
Processed (70) - PNRP14_B.7.33_T274_SLIDE2_PIC2.jpg
Processed (71) - PNRP12_B.4.22_T10_SLIDE7_PIC6.jpg
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Processed (72) - PNRP12_B.4.22_T10_SLIDE6_PIC6.jpg
Processed (73) - PNRP12_B.5.15_T267_SLIDE2_PIC1.jpg
Processed (74) - PNRP16_F.1.28.115.S34_T298_SLIDE1_PIC1.jpg
Processed (75) - PNRP12_B.4.22_T10_SLIDE6_PIC7.jpg
Processed (76) - PNRP12_B.4.22_T10_SLIDE7_PIC7.jpg
Processed (77) - PNRP12_B.4.10_T1_SLIDE1_PIC2.jpg
Processed (78) - PNRP14_B.7.33_T274_SLIDE2_PIC3.jpg
Processed (79) - PNRP14_B.6.44_T165_SLIDE1_PIC2.jpg
Processed (80) - PNRP14_B.7.33_T274_SLIDE3_PIC3.jpg
Processed (81) - PNRP12_B.4.17_T8_SLIDE4_PIC3.jpg
Processed (82) - PNRP14_B.6.44_T165_SLIDE5_PIC8.jpg
Processed (83) - PNRP14_B.7.33_T232_SLIDE4_PIC3.jpg
Processed (84) - PNRP14_B.7.33_T232_SLIDE5_PIC3.jpg
Processed (85) - PNRP12_B.4.22_T10_2_SLIDE6_PIC3.jpg
Processed (86) - PNRP14_B.5.35.27_T280_SLIDE1_PIC1.jpg
Processed (87) - PNRP12_B.4.17_T6_SLIDE2_PIC1.jpg
Processed (88) - PNRP14_B.5.35.17_T72_SLIDE3_PIC2.jpg
Processed (89) - PNRP12_B.6.5.18_T189_SLIDE4_PIC6.jpg
Processed (90) - PNRP12_B.4.17_T6_SLIDE3_PIC1.jpg
Processed (91) - PNRP14_B.5.35.17_T72_SLIDE2_PIC2.jpg
Processed (92) - PNRP14_B.5.33_T39_SLIDE5_PIC4.jpg
Processed (93) - PNRP14_B.7.19.56_T192_SLIDE1_PIC4.jpg
Processed (94) - PNRP16_F.1.28.141.14_T300_SLIDE1_PIC1.jpg
Processed (95) - PNRP14_B.5.35_T90_SLIDE5_PIC2.jpg
Processed (96) - PNRP14_B.5.35_T90_SLIDE4_PIC2.jpg
Processed (97) - PNRP14_B.6.36_T144_SLIDE3_PIC3.jpg
Processed (98) - PNRP14_B.6.36_T144_SLIDE2_PIC3.jpg
Processed (99) - PNRP14_B.6.6_T184_SLIDE3_PIC4.jpg
Processed (100) - PNRP14_B.5.35_T99_SLIDE2_PIC4.jpg
Processed (101) - PNRP14_B.6.44_T154_SLIDE2_PIC2.jpg
Processed (102) - PNRP14_B.6.31_T141_SLIDE4_PIC2.jpg
Processed (103) - TOMB2_COMMINGLED_T250_SLIDE3_PIC2.jpg
Processed (104) - PNRP14_B.7.33_T237_SLIDE1_PIC1.jpg
Processed (105) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC1.jpg
Processed (106) - PNRP14_B.7.33_T234_SLIDE2_PIC3.jpg
Processed (107) - PNRP14_B.7.33_T234_SLIDE3_PIC3.jpg
Processed (108) - TOMB2_BURIAL6_T258_PIC3.jpg
Processed (109) - TOMB2_BURIAL4_T257_SLIDE5_PIC2..jpg
Processed (110) - PNRP14_B.7.34_T245_SLIDE3_PIC4.jpg
Processed (111) - PNRP14_B.5.15_T19_SLIDE5_PIC1.jpg
Processed (112) - PNRP12_B.4.22_T10_SLIDE2_PIC9.jpg
Processed (113) - PNRP12_B.5.15_T263_SLIDE1_PIC2.jpg
Processed (114) - PNRP12_B.6.5.18_T189_SLIDE5_PIC2.jpg
Processed (115) - PNRP12_B.6.5.18_T189_SLIDE4_PIC2.jpg
Processed (116) - TOMB2_COMMINGLED_T251_SLIDE5_PIC2.jpg
Processed (117) - PNRP14_B.7.31_T222_SLIDE1_PIC2.jpg
Processed (118) - PNRP12_B.4.22_T10_SLIDE7_PIC3.jpg
Processed (119) - PNRP12_B.4.22_T10_SLIDE6_PIC3.jpg
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Processed (120) - PNRP12_B.4.22_T10_SLIDE6_PIC2.jpg
Processed (121) - PNRP12_B.4.22_T10_SLIDE7_PIC2.jpg
Processed (122) - PNRP14_B.7.31_T222_SLIDE1_PIC3.jpg
Processed (123) - TOMB2_COMMINGLED_T251_SLIDE4_PIC3.jpg
Processed (124) - PNRP12_B.4.23_T12_SLIDE2_PIC1.jpg
Processed (125) - TOMB2_COMMINGLED_T251_SLIDE5_PIC3.jpg
Processed (126) - PNRP12_B.4.10_T2_SLIDE3_PIC5.jpg
Processed (127) - PNRP12_B.6.5.18_T189_SLIDE4_PIC3.jpg
Processed (128) - PNRP12_B.6.5.18_T189_SLIDE5_PIC3.jpg
Processed (129) - PNRP12_B.4.22_T10_SLIDE2_PIC8.jpg
Processed (130) - PNRP12_B.5.15_T263_SLIDE1_PIC3.jpg
Processed (131) - PNRP14_B.7.34_T245_SLIDE3_PIC5.jpg
Processed (132) - PNRP14_B.7.19.56_T192_SLIDE1_PIC1.jpg
Processed (133) - PNRP14_B.5.33_T39_SLIDE5_PIC1.jpg
Processed (134) - PNRP14_B.5.33_T39_SLIDE4_PIC1.jpg
Processed (135) - PNRP14_B.7.33_T234_SLIDE3_PIC2.jpg
Processed (136) - PNRP14_B.7.33_T234_SLIDE2_PIC2.jpg
Processed (137) - PNRP12_B.4.23_T12_SLIDE8_PIC2.jpg
Processed (138) - PNRP14_B.6.43_T151_SLIDE4_PIC2.jpg
Processed (139) - PNRP14_B.5.35_T99_SLIDE3_PIC1.jpg
Processed (140) - TOMB2_COMMINGLED_T250_SLIDE3_PIC3.jpg
Processed (141) - PNRP14_B.5.35_T99_SLIDE2_PIC1.jpg
Processed (142) - TOMB2_COMMINGLED_T250_SLIDE2_PIC3.jpg
Processed (143) - PNRP14_B.6.31_T141_SLIDE5_PIC1.jpg
Processed (144) - TOMB2_COMMINGLED_T250_SLIDE3_PIC1.jpg
Processed (145) - PNRP14_B.6.6_T184_SLIDE3_PIC3.jpg
Processed (146) - PNRP14_B.6.31_T141_SLIDE4_PIC1.jpg
Processed (147) - PNRP14_B.5.35_T99_SLIDE2_PIC3.jpg
Processed (148) - PNRP14_B.7.33_T237_SLIDE1_PIC2.jpg
Processed (149) - PNRP14_B.5.35_T97_SLIDE4_PIC1.jpg
Processed (150) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC2.jpg
Processed (151) - PNRP14_B.5.33_T39_SLIDE5_PIC3.jpg
Processed (152) - PNRP14_B.7.19.56_T192_SLIDE1_PIC3.jpg
Processed (153) - PNRP16_F.1.28.141.14_T300_SLIDE1_PIC6.jpg
Processed (154) - PNRP12_B.5.15_T263_SLIDE1_PIC1.jpg
Processed (155) - PNRP14_B.7.34_T245_SLIDE3_PIC7.jpg
Processed (156) - PNRP14_B.7.33_T232_SLIDE5_PIC4.jpg
Processed (157) - PNRP12_B.6.5.18_T189_SLIDE4_PIC1.jpg
Processed (158) - PNRP12_B.6.5.18_T189_SLIDE5_PIC1.jpg
Processed (159) - PNRP14_B.7.33_T274_SLIDE3_PIC4.jpg
Processed (160) - TOMB2_COMMINGLED_T251_SLIDE4_PIC1.jpg
Processed (161) - PNRP14_B.6.31_T140_SLIDE3_PIC1.jpg
Processed (162) - PNRP14_B.7.31_T222_SLIDE1_PIC1.jpg
Processed (163) - PNRP16_F.1.28.97.69_T312_SLIDE2_PIC2.jpg
Processed (164) - PNRP12_B.4.22_T10_SLIDE7_PIC1.jpg
Processed (165) - PNRP12_B.4.22_T10_SLIDE6_PIC1.jpg
Processed (166) - PNRP14_B.7.34_T245_SLIDE3_PIC6.jpg
Processed (167) - PNRP14_B.5.33_T39_SLIDE5_PIC2.jpg
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Processed (168) - PNRP14_B.7.19.56_T192_SLIDE1_PIC2.jpg
Processed (169) - PNRP14_B.5.35_T90_SLIDE4_PIC4.jpg
Processed (170) - PNRP14_B.5.35_T83_SLIDE1_PIC1.jpg
Processed (171) - PNRP16_F.1.28.98.S1_T307_SLIDE1_PIC3.jpg
Processed (172) - PNRP14_B.7.33_T234_SLIDE3_PIC1.jpg
Processed (173) - PNRP14_B.7.33_T237_SLIDE1_PIC3.jpg
Processed (174) - PNRP12_B.4.22_T11_SLIDE1_PIC1.jpg
Processed (175) - PNRP14_B.6.43_T151_SLIDE4_PIC1.jpg
Processed (176) - PNRP14_B.6.44_T154_SLIDE2_PIC4.jpg
Processed (177) - PNRP14_B.5.35_T99_SLIDE2_PIC2.jpg
Processed (178) - PNRP12_B.5.31_T283_SLIDE1_PIC3.jpg
Processed (179) - PNRP14_B.5.35_T99_SLIDE3_PIC2.jpg
Processed (180) - PNRP14_B.6.6_T184_SLIDE3_PIC2.jpg
Processed (181) - PNRP14_B.5.35_T97_SLIDE2_PIC2.jpg
Processed (182) - PNRP14_B.7.31_T272_SLIDE1_PIC1.jpg
Processed (183) - PNRP14_B.5.35_T77_SLIDE4_PIC2.jpg
Processed (184) - PNRP12_B.5.15_T23_SLIDE5_PIC1.jpg
Processed (185) - PNRP14_B.7.33_T228_SLIDE1_PIC4.jpg
Processed (186) - TOMB2_COMMINGLED_T251_SLIDE2_PIC2.jpg
Processed (187) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC1.jpg
Processed (188) - PNRP12_B.4.22_T10_SLIDE5_PIC9.jpg
Processed (189) - PNRP12_B.6.5.18_T189_SLIDE2_PIC2.jpg
Processed (190) - PNRP14_B.7.20_T205_SLIDE1_PIC2.jpg
Processed (191) - PNRP14_B.7.19.56_T194_SLIDE1_PIC4.jpg
Processed (192) - PNRP12_B.4.10_T2_SLIDE5_PIC5.jpg
Processed (193) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC1.jpg
Processed (194) - PNRP14_B.7.33_T235_SLIDE2_PIC2.jpg
Processed (195) - PNRP12_B.6.5.18_T189_SLIDE2_PIC3.jpg
Processed (196) - PNRP14_B.7.20_T205_SLIDE1_PIC3.jpg
Processed (197) - PNRP12_B.4.17_T6_SLIDE4_PIC4.jpg
Processed (198) - PNRP12_B.4.22_T10_SLIDE5_PIC8.jpg
Processed (199) - PNRP12_B.4.23_T12_SLIDE5_PIC1.jpg
Processed (200) - TOMB2_COMMINGLED_T251_SLIDE3_PIC3.jpg
Processed (201) - TOMB2_COMMINGLED_T251_SLIDE2_PIC3.jpg
Processed (202) - TOMB2_BURIAL6_T258_SLIDE5_PIC1.jpg
Processed (203) - PNRP14_B.6.43_T151_SLIDE2_PIC2.jpg
Processed (204) - PNRP14_B.5.34_T51_SLIDE1_PIC1.jpg
Processed (205) - PNRP14_B.5.33_T39_SLIDE3_PIC1.jpg
Processed (206) - PNRP14_B.5.15_T22_SLIDE5_PIC4.jpg
Processed (207) - PNRP14_B.5.35_T97_SLIDE2_PIC3.jpg
Processed (208) - PNRP14_B.5.35_T97_SLIDE3_PIC3.jpg
Processed (209) - PNRP14_B.5.35_T97_SLIDE2_PIC1.jpg
Processed (210) - PNRP14_B.6.43_T152_SLIDE1_PIC2.jpg
Processed (211) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC4.jpg
Processed (212) - PNRP14_B.5.33_T39_SLIDE3_PIC3.jpg
Processed (213) - PNRP14_B.6.31_T141_SLIDE2_PIC1.jpg
Processed (214) - PNRP14_B.5.35_T99_SLIDE4_PIC3.jpg
Processed (215) - PNRP14_B.7.31_T272_SLIDE1_PIC2.jpg
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Processed (216) - PNRP14_B.5.35_T59_SLIDE1_PIC4.jpg
Processed (217) - PNRP14_B.5.35_T77_SLIDE4_PIC1.jpg
Processed (218) - PNRP12_B.5.15_T23_SLIDE5_PIC2.jpg
Processed (219) - PNRP14_B.7.33_T274_SLIDE4_PIC4.jpg
Processed (220) - TOMB2_COMMINGLED_T251_SLIDE3_PIC1.jpg
Processed (221) - PNRP12_B.4.23_T12_SLIDE5_PIC3.jpg
Processed (222) - TOMB2_COMMINGLED_T251_SLIDE2_PIC1.jpg
Processed (223) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC2.jpg
Processed (224) - PNRP14_B.7.33_T232_SLIDE2_PIC4.jpg
Processed (225) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC4.jpg
Processed (226) - PNRP12_B.5.15_T26_SLIDE1_PIC4.jpg
Processed (227) - PNRP14_B.7.20_T205_SLIDE1_PIC1.jpg
Processed (228) - PNRP12_B.6.5.18_T189_SLIDE2_PIC1.jpg
Processed (229) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC3.jpg
Processed (230) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC2.jpg
Processed (231) - PNRP14_B.5.35_T82_SLIDE1_PIC1.jpg
Processed (232) - PNRP12_B.5.15_T26_SLIDE1_PIC5.jpg
Processed (233) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC3.jpg
Processed (234) - TOMB2_BURIAL6_T258_SLIDE5_PIC2.jpg
Processed (235) - PNRP12_B.4.23_T12_SLIDE5_PIC2.jpg
Processed (236) - PNRP14_B.6.43_T151_SLIDE2_PIC1.jpg
Processed (237) - PNRP12_B.4.22_T11_SLIDE6_PIC1.jpg
Processed (238) - PNRP14_B.6.44_T154_SLIDE4_PIC4.jpg
Processed (239) - PNRP14_B.5.35_T99_SLIDE4_PIC2.jpg
Processed (240) - PNRP14_B.5.33_T39_SLIDE3_PIC2.jpg
Processed (241) - PNRP14_B.6.43_T152_SLIDE1_PIC3.jpg
Processed (242) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC1.jpg
Processed (243) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC1.jpg
Processed (244) - PNRP12_B.4.22_T10_SLIDE5_PIC10.jpg
Processed (245) - PNRP14_B.5.35_T97_SLIDE2_PIC4.jpg
Processed (246) - PNRP14_B.5.35_T97_SLIDE3_PIC4.jpg
Processed (247) - PNRP14_B.6.44_T167_SLIDE3_PIC2.jpg
Processed (248) - PNRP14_B.5.15_T22_SLIDE5_PIC3.jpg
Processed (249) - PNRP14_B.5.35_T109_SLIDE2_PIC1.jpg
Processed (250) - PNRP14_B.5.35_T59_SLIDE1_PIC1.jpg
Processed (251) - PNRP14_B.5.35_T109_SLIDE3_PIC1.jpg
Processed (252) - PNRP14_B.6.36_T144_SLIDE4_PIC1.jpg
Processed (253) - PNRP12_B.5.15_T266_SLIDE2_PIC2.jpg
Processed (254) - PNRP12_B.4.17_T8_SLIDE3_PIC1.jpg
Processed (255) - PNRP12_B.4.17_T8_SLIDE2_PIC1.jpg
Processed (256) - PNRP14_B.6.32_T142_SLIDE4_PIC1.jpg
Processed (257) - PNRP14_B.7.33_T274_SLIDE4_PIC1.jpg
Processed (258) - PNRP14_B.7.33_T228_SLIDE1_PIC2.jpg
Processed (259) - PNRP12_B.5.15_T267_SLIDE4_PIC2.jpg
Processed (260) - PNRP12_B.5.15_T26_SLIDE1_PIC1.jpg
Processed (261) - PNRP12_B.6.5.18_T189_SLIDE2_PIC4.jpg
Processed (262) - PNRP12_B.4.17_T6_SLIDE4_PIC3.jpg
Processed (263) - PNRP14_B.7.33_T232_SLIDE2_PIC1.jpg
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Processed (264) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC1.jpg
Processed (265) - PNRP14_B.5.35_T85_SLIDE1_PIC1.jpg
Processed (266) - PNRP14_B.7.19.56_T194_SLIDE1_PIC2.jpg
Processed (267) - PNRP12_B.4.10_T2_SLIDE5_PIC2.jpg
Processed (268) - PNRP12_B.4.10_T2_SLIDE4_PIC2.jpg
Processed (269) - PNRP14_B.7.34_T248_SLIDE1_PIC2.jpg
Processed (270) - PNRP14_B.7.19.56_T194_SLIDE1_PIC3.jpg
Processed (271) - PNRP14_B.7.20_T202_SLIDE1_PIC1.jpg
Processed (272) - PNRP12_B.4.17_T6_SLIDE4_PIC2.jpg
Processed (273) - PNRP12_B.5.15_T267_SLIDE4_PIC3.jpg
Processed (274) - PNRP12_B.5.15_T266_SLIDE2_PIC3.jpg
Processed (275) - PNRP14_B.5.35_T110_SLIDE3_PIC1.jpg
Processed (276) - PNRP14_B.7.34_T247_SLIDE1_PIC1.jpg
Processed (277) - PNRP14_B.5.35_T110_SLIDE2_PIC1.jpg
Processed (278) - PNRP14_B.6.44_T154_SLIDE4_PIC1.jpg
Processed (279) - PNRP14_B.6.28_T132_SLIDE3_PIC1.jpg
Processed (280) - PNRP14_B.5.15_T22_SLIDE5_PIC2.jpg
Processed (281) - PNRP14_B.6.44_T167_SLIDE3_PIC3.jpg
Processed (282) - PNRP12_B.4.22_T10_SLIDE5_PIC11.jpg
Processed (283) - PNRP14_B.5.35_T90_SLIDE3_PIC1.jpg
Processed (284) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC2.jpg
Processed (285) - PNRP14_B.5.34_SKULL9_T46_SLIDE4_PIC2.jpg
Processed (286) - PNRP14_B.6.43_T152_SLIDE1_PIC4.jpg
Processed (287) - PNRP12_B.4.22_T10_SLIDE5_PIC13.jpg
Processed (288) - PNRP14_B.6.44_T167_SLIDE2_PIC1.jpg
Processed (289) - PNRP14_B.6.44_T167_SLIDE3_PIC1.jpg
Processed (290) - PNRP14_B.5.35_T109_SLIDE3_PIC2.jpg
Processed (291) - PNRP14_B.6.44_T154_SLIDE4_PIC3.jpg
Processed (292) - PNRP14_B.5.35_T59_SLIDE1_PIC2.jpg
Processed (293) - PNRP14_B.5.35_T99_SLIDE4_PIC5.jpg
Processed (294) - PNRP14_B.6.36_T144_SLIDE4_PIC2.jpg
Processed (295) - PNRP14_B.7.34_T247_SLIDE1_PIC3.jpg
Processed (296) - PNRP14_B.5.35_T93_SLIDE1_PIC1.jpg
Processed (297) - PNRP12_B.5.15_T266_SLIDE3_PIC1.jpg
Processed (298) - PNRP12_B.5.15_T266_SLIDE2_PIC1.jpg
Processed (299) - PNRP12_B.4.17_T8_SLIDE2_PIC2.jpg
Processed (300) - PNRP12_B.4.17_T8_SLIDE3_PIC2.jpg
Processed (301) - PNRP14_B.7.33_T228_SLIDE1_PIC1.jpg
Processed (302) - PNRP14_B.7.33_T274_SLIDE4_PIC2.jpg
Processed (303) - PNRP14_B.6.32_T142_SLIDE4_PIC2.jpg
Processed (304) - PNRP12_B.5.15_T267_SLIDE4_PIC1.jpg
Processed (305) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC4.jpg
Processed (306) - PNRP12_B.5.15_T26_SLIDE1_PIC2.jpg
Processed (307) - PNRP14_B.7.19.56_T199_SLIDE5_PIC1.jpg
Processed (308) - PNRP14_B.5.35_T85_SLIDE1_PIC2.jpg
Processed (309) - PNRP14_B.7.33_T232_SLIDE2_PIC2.jpg
Processed (310) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC2.jpg
Processed (311) - PNRP16_F.1.28.90.S1.BO_T305_SLIDE2_PIC5.jpg
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Processed (312) - PNRP14_B.7.34_T248_SLIDE1_PIC1.jpg
Processed (313) - PNRP12_B.4.10_T2_SLIDE4_PIC1.jpg
Processed (314) - PNRP14_B.7.19.56_T194_SLIDE1_PIC1.jpg
Processed (315) - PNRP12_B.4.10_T2_SLIDE5_PIC1.jpg
Processed (316) - PNRP14_B.6.44_T165_SLIDE3_PIC8.jpg
Processed (317) - PNRP14_B.7.20_T202_SLIDE1_PIC2.jpg
Processed (318) - PNRP14_B.5.35_T85_SLIDE1_PIC3.jpg
Processed (319) - PNRP14_B.5.34_SKULL9_T47_SLIDE2_PIC3.jpg
Processed (320) - PNRP14_B.7.33_T232_SLIDE2_PIC3.jpg
Processed (321) - PNRP12_B.4.17_T6_SLIDE4_PIC1.jpg
Processed (322) - PNRP16_F.1.28.97.69_T312_SLIDE4_PIC5.jpg
Processed (323) - PNRP14_B.7.33_T274_SLIDE4_PIC3.jpg
Processed (324) - PNRP12_B.4.23_T12_SLIDE5_PIC4.jpg
Processed (325) - PNRP12_B.4.17_T8_SLIDE3_PIC3.jpg
Processed (326) - PNRP12_B.4.17_T8_SLIDE2_PIC3.jpg
Processed (327) - PNRP14_B.7.34_T247_SLIDE1_PIC2.jpg
Processed (328) - PNRP14_B.6.36_T144_SLIDE4_PIC3.jpg
Processed (329) - PNRP14_B.5.35_T99_SLIDE4_PIC4.jpg
Processed (330) - PNRP14_B.6.44_T154_SLIDE4_PIC2.jpg
Processed (331) - PNRP14_B.6.28_T132_SLIDE3_PIC2.jpg
Processed (332) - PNRP14_B.5.33_T39_SLIDE3_PIC4.jpg
Processed (333) - PNRP14_B.5.15_T22_SLIDE5_PIC1.jpg
Processed (334) - PNRP12_B.4.22_T10_SLIDE5_PIC12.jpg
Processed (335) - PNRP14_B.5.34_SKULL9_T46_SLIDE5_PIC3.jpg
Processed (336) - PNRP14_B.7.33_T237_SLIDE3_PIC2.jpg
Processed (337) - PNRP14_B.7.33_T237_SLIDE2_PIC2.jpg
Processed (338) - PNRP14_B.5.35_T94_SLIDE4_PIC3.jpg
Processed (339) - PNRP12_B.4.17_T282_SLIDE3_PIC2.jpg
Processed (340) - PNRP12_B.6.10.35_T135_SLIDE4_PIC3.jpg
Processed (341) - PNRP14_B.6.34_T143_SLIDE3_PIC2.jpg
Processed (342) - PNRP12_B.4.17_T282_SLIDE2_PIC2.jpg
Processed (343) - TOMB2_COMMINGLED_T250_SLIDE1_PIC1.jpg
Processed (344) - PNRP14_B.7.27_T211_SLIDE2_PIC3.jpg
Processed (345) - PNRP14_B.7.31_T219_SLIDE5_PIC5.jpg
Processed (346) - PNRP14_B.7.31_T272_SLIDE4_PIC2.jpg
Processed (347) - PNRP14_B.7.19.56_T192_SLIDE2_PIC3.jpg
Processed (348) - PNRP14_B.7.19.56_T192_SLIDE3_PIC3.jpg
Processed (349) - PNRP14_B.6.43_T152_SLIDE4_PIC2.jpg
Processed (350) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC2.jpg
Processed (351) - PNRP14_B.6.38_T275_SLIDE3_PIC3.jpg
Processed (352) - PNRP14_B.6.43_T152_SLIDE5_PIC2.jpg
Processed (353) - PNRP16_F.1.28.98.S1_T307_SLIDE2_PIC2.jpg
Processed (354) - PNRP16_F.1.28.97.69_T312_SLIDE2_1.jpg
Processed (355) - PNRP12_B.5.15_T262_SLIDE4_PIC1.jpg
Processed (356) - PNRP12_B.5.15_T263_SLIDE2_PIC1.jpg
Processed (357) - PNRP14_B.7.33_T232_SLIDE6_PIC4.jpg
Processed (358) - PNRP14_B.5.15_T19_SLIDE6_PIC2.jpg
Processed (359) - PNRP12_B.5.15_T263_SLIDE3_PIC1.jpg
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Processed (360) - PNRP14_B.7.20_T205_SLIDE4_PIC1.jpg
Processed (361) - PNRP14_B.5.35_T105_SLIDE4_PIC4.jpg
Processed (362) - PNRP14_B.6.37_T147_SLIDE4_PIC3.jpg
Processed (363) - PNRP14_B.7.31_T222_SLIDE3_PIC1.jpg
Processed (364) - PNRP14_B.7.31_T222_SLIDE2_PIC1.jpg
Processed (365) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC2.jpg
Processed (366) - PNRP14_B.6.44_T165_SLIDE3_PIC5.jpg
Processed (367) - PNRP12_B.4.10_T1_SLIDE2_PIC5.jpg
Processed (368) - PNRP12_B.5.0_T17_SLIDE2_PIC2.jpg
Processed (369) - PNRP12_B.4.10_T1_SLIDE3_PIC4.jpg
Processed (370) - PNRP14_B.6.44_T165_SLIDE3_PIC4.jpg
Processed (371) - PNRP12_B.4.10_T1_SLIDE2_PIC4.jpg
Processed (372) - PNRP12_B.4.22_T10_SLIDE4_PIC1.jpg
Processed (373) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC3.jpg
Processed (374) - PNRP12_B.4.22_T10_SLIDE5_PIC1.jpg
Processed (375) - PNRP14_B.5.32.115_T34_SLIDE4_PIC2.jpg
Processed (376) - PNRP14_B.6.37_T147_SLIDE4_PIC2.jpg
Processed (377) - PNRP14_B.7.33_T232_SLIDE6_PIC5.jpg
Processed (378) - PNRP14_B.5.15_T19_SLIDE6_PIC3.jpg
Processed (379) - PNRP14_B.6.43_T152_SLIDE5_PIC3.jpg
Processed (380) - PNRP14_B.7.33_T234_SLIDE1_PIC1.jpg
Processed (381) - PNRP14_B.6.38_T275_SLIDE2_PIC2.jpg
Processed (382) - PNRP14_B.5.35_T83_SLIDE2_PIC1.jpg
Processed (383) - PNRP14_B.6.38_T275_SLIDE3_PIC2.jpg
Processed (384) - PNRP14_B.6.43_T152_SLIDE4_PIC3.jpg
Processed (385) - PNRP14_B.7.19.56_T192_SLIDE3_PIC2.jpg
Processed (386) - PNRP14_B.7.19.56_T192_SLIDE2_PIC2.jpg
Processed (387) - PNRP14_B.7.31_T219_SLIDE5_PIC4.jpg
Processed (388) - PNRP14_B.7.27_T211_SLIDE2_PIC2.jpg
Processed (389) - PNRP14_B.6.34_T143_SLIDE3_PIC3.jpg
Processed (390) - PNRP12_B.4.17_T282_SLIDE2_PIC3.jpg
Processed (391) - PNRP12_B.6.10.35_T135_SLIDE5_PIC2.jpg
Processed (392) - PNRP14_B.7.32_T226_SLIDE4_PIC1.jpg
Processed (393) - PNRP12_B.4.17_T282_SLIDE3_PIC3.jpg
Processed (394) - PNRP12_B.6.10.35_T135_SLIDE4_PIC2.jpg
Processed (395) - PNRP14_B.5.35_T94_SLIDE4_PIC2.jpg
Processed (396) - PNRP14_B.7.33_T237_SLIDE2_PIC3.jpg
Processed (397) - PNRP12_B.4.22_T11_SLIDE3_PIC1.jpg
Processed (398) - PNRP12_B.4.22_T11_SLIDE2_PIC1.jpg
Processed (399) - PNRP14_B.7.33_T237_SLIDE3_PIC3.jpg
Processed (400) - PNRP14_B.7.33_T237_SLIDE2_PIC1.jpg
Processed (401) - PNRP14_B.7.32_T226_SLIDE4_PIC3.jpg
Processed (402) - PNRP12_B.4.17_T282_SLIDE2_PIC1.jpg
Processed (403) - PNRP14_B.5.35_T93_SLIDE5_PIC4.jpg
Processed (404) - PNRP12_B.4.17_T282_SLIDE3_PIC1.jpg
Processed (405) - PNRP14_B.7.31_T219_SLIDE5_PIC6.jpg
Processed (406) - PNRP14_B.7.31_T272_SLIDE4_PIC1.jpg
Processed (407) - PNRP14_B.7.19.56_T195_SLIDE3_PIC4.jpg
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Processed (408) - PNRP14_B.7.19.56_T195_SLIDE2_PIC4.jpg
Processed (409) - PNRP14_B.7.33_T234_SLIDE1_PIC3.jpg
Processed (410) - PNRP16_F.1.28.98.S1_T307_SLIDE2_PIC1.jpg
Processed (411) - PNRP14_B.6.43_T152_SLIDE5_PIC1.jpg
Processed (412) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC1.jpg
Processed (413) - PNRP14_B.6.43_T152_SLIDE4_PIC1.jpg
Processed (414) - PNRP12_B.5.15_T262_SLIDE4_PIC2.jpg
Processed (415) - PNRP14_B.5.35_T73_SLIDE3_PIC4.jpg
Processed (416) - PNRP12_B.5.15_T263_SLIDE3_PIC2.jpg
Processed (417) - PNRP12_B.5.15_T263_SLIDE2_PIC2.jpg
Processed (418) - PNRP14_B.7.20_T205_SLIDE4_PIC2.jpg
Processed (419) - PNRP14_B.7.31_T222_SLIDE2_PIC2.jpg
Processed (420) - PNRP14_B.7.31_T222_SLIDE3_PIC2.jpg
Processed (421) - PNRP12_B.4.22_T10_SLIDE4_PIC3.jpg
Processed (422) - PNRP14_B.5.32.115_T33_SLIDE4_PIC4.jpg
Processed (423) - PNRP14_B.5.32.115_T33_SLIDE5_PIC4.jpg
Processed (424) - PNRP12_B.4.22_T10_SLIDE5_PIC3.jpg
Processed (425) - PNRP16_F.1.28.97.69_T312_SLIDE1_PIC1.jpg
Processed (426) - PNRP14_B.6.44_T165_SLIDE3_PIC6.jpg
Processed (427) - PNRP14_B.6.44_T165_SLIDE3_PIC7.jpg
Processed (428) - PNRP14_B.5.32.115_T33_SLIDE4_PIC5.jpg
Processed (429) - PNRP12_B.4.22_T10_SLIDE4_PIC2.jpg
Processed (430) - PNRP14_B.7.31_T222_SLIDE2_PIC3.jpg
Processed (431) - PNRP14_B.5.32.115_T34_SLIDE4_PIC1.jpg
Processed (432) - PNRP14_B.7.20_T205_SLIDE4_PIC3.jpg
Processed (433) - PNRP14_B.6.42_T276_SLIDE4_PIC4.jpg
Processed (434) - PNRP12_B.5.15_T263_SLIDE2_PIC3.jpg
Processed (435) - PNRP14_B.7.34_T245_SLIDE1_PIC5.jpg
Processed (436) - PNRP14_B.7.33_T232_SLIDE6_PIC6.jpg
Processed (437) - PNRP14_B.6.38_T275_SLIDE3_PIC1.jpg
Processed (438) - PNRP14_B.7.33_T234_SLIDE1_PIC2.jpg
Processed (439) - PNRP14_B.6.38_T275_SLIDE2_PIC1.jpg
Processed (440) - PNRP16_F.1.28.141.14_T300_SLIDE3_PIC4.jpg
Processed (441) - PNRP14_B.7.19.56_T192_SLIDE2_PIC1.jpg
Processed (442) - PNRP14_B.7.19.56_T192_SLIDE3_PIC1.jpg
Processed (443) - PNRP14_B.7.27_T211_SLIDE2_PIC1.jpg
Processed (444) - PNRP14_B.5.35_T93_SLIDE5_PIC5.jpg
Processed (445) - PNRP12_B.6.10.35_T135_SLIDE5_PIC1.jpg
Processed (446) - PNRP14_B.7.32_T226_SLIDE4_PIC2.jpg
Processed (447) - PNRP14_B.5.35_T94_SLIDE5_PIC1.jpg
Processed (448) - PNRP14_B.5.35_T94_SLIDE4_PIC1.jpg
Processed (449) - PNRP12_B.4.22_T11_SLIDE3_PIC2.jpg
Processed (450) - PNRP14_B.5.35_T93_SLIDE4_PIC1.jpg
Processed (451) - PNRP14_B.5.35_T93_SLIDE5_PIC1.jpg
Processed (452) - PNRP12_B.6.10.35_T135_SLIDE4_PIC5.jpg
Processed (453) - PNRP14_B.7.31_T219_SLIDE5_PIC3.jpg
Processed (454) - PNRP14_B.7.19.56_T195_SLIDE3_PIC1.jpg
Processed (455) - PNRP14_B.7.19.56_T195_SLIDE2_PIC1.jpg
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Processed (456) - PNRP14_B.5.35_T73_SLIDE3_PIC1.jpg
Processed (457) - PNRP14_B.5.35_T73_SLIDE2_PIC1.jpg
Processed (458) - PNRP14_B.6.43_T152_SLIDE5_PIC4.jpg
Processed (459) - PNRP16_F.1.28.98.S1_T307_SLIDE3_PIC4.jpg
Processed (460) - PNRP14_B.6.44_T166_SLIDE1_PIC1.jpg
Processed (461) - PNRP14_B.7.34_T248_SLIDE4_PIC1.jpg
Processed (462) - PNRP12_B.4.22_T10_2_SLIDE4_PIC2.jpg
Processed (463) - PNRP12_B.4.22_T10_2_SLIDE5_PIC2.jpg
Processed (464) - PNRP14_B.7.33_T232_SLIDE6_PIC2.jpg
Processed (465) - PNRP14_B.7.34_T245_SLIDE1_PIC1.jpg
Processed (466) - PNRP14_B.5.35_T85_SLIDE4_PIC2.jpg
Processed (467) - PNRP12_B.4.22_T10_SLIDE4_PIC6.jpg
Processed (468) - PNRP12_B.5.15_T267_SLIDE1_PIC1.jpg
Processed (469) - PNRP14_B.5.32.115_T33_SLIDE5_PIC1.jpg
Processed (470) - PNRP12_B.4.22_T10_SLIDE5_PIC6.jpg
Processed (471) - PNRP16_F.1.28.115.S34_T298_SLIDE2_PIC1.jpg
Processed (472) - PNRP14_B.5.35_T105_SLIDE4_PIC2.jpg
Processed (473) - PNRP14_B.6.44_T165_SLIDE2_PIC3.jpg
Processed (474) - PNRP12_B.4.10_T1_SLIDE3_PIC3.jpg
Processed (475) - PNRP14_B.7.33_T228_SLIDE4_PIC1.jpg
Processed (476) - PNRP12_B.4.10_T1_SLIDE2_PIC3.jpg
Processed (477) - PNRP14_B.6.44_T165_SLIDE3_PIC2.jpg
Processed (478) - PNRP12_B.4.10_T1_SLIDE2_PIC2.jpg
Processed (479) - PNRP12_B.4.10_T1_SLIDE3_PIC2.jpg
Processed (480) - PNRP14_B.6.37_T147_SLIDE4_PIC4.jpg
Processed (481) - PNRP14_B.5.35_T105_SLIDE4_PIC3.jpg
Processed (482) - PNRP12_B.4.22_T10_SLIDE5_PIC7.jpg
Processed (483) - PNRP12_B.4.22_T10_SLIDE4_PIC7.jpg
Processed (484) - PNRP14_B.5.35_T85_SLIDE4_PIC3.jpg
Processed (485) - PNRP14_B.5.34_T59_SLIDE4_PIC2.jpg
Processed (486) - PNRP14_B.7.33_T232_SLIDE6_PIC3.jpg
Processed (487) - PNRP14_B.6.42_T276_SLIDE4_PIC1.jpg
Processed (488) - PNRP12_B.4.22_T10_2_SLIDE5_PIC3.jpg
Processed (489) - PNRP14_B.5.35.27_T280_SLIDE2_PIC1.jpg
Processed (490) - PNRP14_B.5.35.17_T72_SLIDE1_PIC2.jpg
Processed (491) - PNRP14_B.5.35.27_T281_SLIDE5_PIC1.jpg
Processed (492) - PNRP16_F.1.28.115.35_T320_SLIDE1_PIC3.jpg
Processed (493) - PNRP12_B.5.31_T259_SLIDE4_PIC1.jpg
Processed (494) - PNRP14_B.7.19.56_T192_SLIDE2_PIC4.jpg
Processed (495) - PNRP14_B.7.20_T202_SLIDE1_PIC13.jpg
Processed (496) - PNRP14_B.7.31_T219_SLIDE5_PIC2.jpg
Processed (497) - PNRP14_B.7.27_T211_SLIDE2_PIC4.jpg
Processed (498) - PNRP14_B.6.44_T154_SLIDE1_PIC2.jpg
Processed (499) - PNRP12_B.6.10.35_T135_SLIDE4_PIC4.jpg
Processed (500) - PNRP14_B.5.35_T93_SLIDE5_PIC2.jpg
Processed (501) - PNRP14_B.5.35_T93_SLIDE4_PIC2.jpg
Processed (502) - PNRP14_B.7.19.56_T195_SLIDE2_PIC2.jpg
Processed (503) - PNRP14_B.7.19.56_T195_SLIDE3_PIC2.jpg
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Processed (504) - PNRP14_B.5.35_T73_SLIDE2_PIC2.jpg
Processed (505) - PNRP12_B.5.31_T259_SLIDE4_PIC3.jpg
Processed (506) - PNRP16_F.1.28.115.35_T320_SLIDE1_PIC1.jpg
Processed (507) - PNRP14_B.5.35_T73_SLIDE3_PIC2.jpg
Processed (508) - PNRP14_B.7.33_T234_SLIDE1_PIC5.jpg
Processed (509) - PNRP14_B.7.34_T248_SLIDE4_PIC2.jpg
Processed (510) - PNRP14_B.6.44_T166_SLIDE1_PIC2.jpg
Processed (511) - PNRP12_B.4.22_T10_2_SLIDE5_PIC1.jpg
Processed (512) - PNRP14_B.6.42_T276_SLIDE4_PIC3.jpg
Processed (513) - PNRP12_B.4.22_T10_2_SLIDE4_PIC1.jpg
Processed (514) - PNRP14_B.6.42_T276_SLIDE5_PIC3.jpg
Processed (515) - PNRP14_B.5.35_T85_SLIDE4_PIC1.jpg
Processed (516) - PNRP14_B.7.34_T245_SLIDE1_PIC2.jpg
Processed (517) - PNRP14_B.7.33_T232_SLIDE6_PIC1.jpg
Processed (518) - PNRP14_B.5.32.115_T33_SLIDE5_PIC2.jpg
Processed (519) - PNRP12_B.4.22_T10_SLIDE5_PIC5.jpg
Processed (520) - PNRP12_B.5.15_T267_SLIDE1_PIC2.jpg
Processed (521) - PNRP12_B.4.22_T10_SLIDE4_PIC5.jpg
Processed (522) - PNRP16_F.1.28.115.S34_T298_SLIDE3_PIC2.jpg
Processed (523) - PNRP14_B.5.35_T105_SLIDE4_PIC1.jpg
Processed (524) - PNRP14_B.7.33_T228_SLIDE4_PIC2.jpg
Processed (525) - PNRP14_B.6.44_T165_SLIDE2_PIC1.jpg
Processed (526) - PNRP12_B.4.10_T1_SLIDE2_PIC1.jpg
Processed (527) - PNRP14_B.6.44_T165_SLIDE3_PIC1.jpg
Processed (528) - PNRP12_B.5.17_T29_SLIDE4_PIC1.jpg
Processed (529) - PNRP16_F.1.28.115.S34_T298_SLIDE2_PIC3.jpg
Processed (530) - PNRP14_B.5.32.115_T33_SLIDE4_PIC3.jpg
Processed (531) - PNRP12_B.4.22_T10_SLIDE4_PIC4.jpg
Processed (532) - PNRP12_B.4.22_T10_SLIDE5_PIC4.jpg
Processed (533) - PNRP12_B.5.15_T267_SLIDE1_PIC3.jpg
Processed (534) - PNRP14_B.5.34_T59_SLIDE5_PIC1.jpg
Processed (535) - PNRP14_B.5.34_T59_SLIDE4_PIC1.jpg
Processed (536) - PNRP14_B.5.35.17_T72_SLIDE1_PIC1.jpg
Processed (537) - PNRP14_B.6.42_T276_SLIDE5_PIC2.jpg
Processed (538) - PNRP14_B.5.35.27_T280_SLIDE2_PIC2.jpg
Processed (539) - PNRP14_B.6.42_T276_SLIDE4_PIC2.jpg
Processed (540) - PNRP14_B.7.34_T248_SLIDE4_PIC3.jpg
Processed (541) - PNRP14_B.7.33_T234_SLIDE1_PIC4.jpg
Processed (542) - PNRP14_B.5.35.27_T281_SLIDE5_PIC2.jpg
Processed (543) - PNRP14_B.5.35_T73_SLIDE3_PIC3.jpg
Processed (544) - PNRP16_F.1.28.141.14_T300_SLIDE3_PIC2.jpg
Processed (545) - PNRP14_B.7.19.56_T195_SLIDE3_PIC3.jpg
Processed (546) - PNRP14_B.7.19.56_T195_SLIDE2_PIC3.jpg
Processed (547) - PNRP14_B.7.31_T219_SLIDE5_PIC1.jpg
Processed (548) - PNRP14_B.6.44_T154_SLIDE1_PIC1.jpg
Processed (549) - PNRP14_B.5.35_T93_SLIDE4_PIC3.jpg
Processed (550) - PNRP14_B.5.35_T73_SLIDE4_PIC1.jpg
Processed (551) - PNRP14_B.5.35_T90_SLIDE1_PIC3.jpg
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Processed (552) - PNRP14_B.5.35_T73_SLIDE5_PIC1.jpg
Processed (553) - PNRP14_B.7.34_T247_SLIDE3_PIC3.jpg
Processed (554) - PNRP14_B.5.35_T93_SLIDE3_PIC1.jpg
Processed (555) - PNRP12_B.5.15_T23_SLIDE7_PIC4.jpg
Processed (556) - PNRP12_B.4.17_T282_SLIDE4_PIC4.jpg
Processed (557) - PNRP14_B.5.35_T93_SLIDE2_PIC1.jpg
Processed (558) - PNRP12_B.5.15_T266_SLIDE1_PIC1.jpg
Processed (559) - PNRP14_B.5.35_T59_SLIDE3_PIC2.jpg
Processed (560) - PNRP14_B.6.28_T132_SLIDE1_PIC3.jpg
Processed (561) - PNRP14_B.7.31_T219_SLIDE2_PIC3.jpg
Processed (562) - PNRP14_B.7.31_T219_SLIDE3_PIC3.jpg
Processed (563) - PNRP12_B.4.22_T10_SLIDE2_PIC6.jpg
Processed (564) - PNRP14_B.5.35_T105_SLIDE3_PIC2.jpg
Processed (565) - PNRP12_B.5.17_T29_SLIDE2_PIC3.jpg
Processed (566) - PNRP14_B.6.44_T165_SLIDE5_PIC3.jpg
Processed (567) - PNRP14_B.7.33_T228_SLIDE2_PIC1.jpg
Processed (568) - PNRP14_B.6.44_T165_SLIDE4_PIC3.jpg
Processed (569) - PNRP14_B.7.19.56_T194_SLIDE3_PIC1.jpg
Processed (570) - PNRP14_B.7.19.56_T194_SLIDE2_PIC1.jpg
Processed (571) - PNRP12_B.5.15_T26_SLIDE3_PIC2.jpg
Processed (572) - PNRP14_B.7.33_T232_SLIDE1_PIC2.jpg
Processed (573) - PNRP14_B.5.35_T85_SLIDE2_PIC2.jpg
Processed (574) - PNRP14_B.7.20_T202_SLIDE2_PIC3.jpg
Processed (575) - PNRP14_B.5.35_T85_SLIDE3_PIC2.jpg
Processed (576) - PNRP14_B.5.34_T59_SLIDE3_PIC3.jpg
Processed (577) - PNRP14_B.5.34_T59_SLIDE3_PIC2.jpg
Processed (578) - PNRP14_B.5.35_T85_SLIDE3_PIC3.jpg
Processed (579) - PNRP14_B.7.33_T232_SLIDE1_PIC3.jpg
Processed (580) - PNRP14_B.7.20_T202_SLIDE2_PIC2.jpg
Processed (581) - PNRP14_B.5.35_T85_SLIDE2_PIC3.jpg
Processed (582) - PNRP14_B.6.42_T276_SLIDE3_PIC1.jpg
Processed (583) - PNRP14_B.6.42_T276_SLIDE2_PIC1.jpg
Processed (584) - PNRP14_B.6.44_T165_SLIDE4_PIC2.jpg
Processed (585) - PNRP14_B.6.44_T165_SLIDE5_PIC2.jpg
Processed (586) - PNRP12_B.5.17_T29_SLIDE3_PIC2.jpg
Processed (587) - PNRP12_B.5.17_T29_SLIDE2_PIC2.jpg
Processed (588) - PNRP14_B.5.35_T105_SLIDE3_PIC3.jpg
Processed (589) - PNRP14_B.5.35_T105_SLIDE2_PIC3.jpg
Processed (590) - PNRP12_B.4.22_T10_SLIDE2_PIC7.jpg
Processed (591) - PNRP14_B.7.31_T219_SLIDE3_PIC2.jpg
Processed (592) - PNRP14_B.7.31_T219_SLIDE2_PIC2.jpg
Processed (593) - PNRP14_B.5.35_T59_SLIDE3_PIC3.jpg
Processed (594) - PNRP14_B.6.28_T132_SLIDE1_PIC2.jpg
Processed (595) - PNRP14_B.6.44_T164_SLIDE2_PIC2.jpg
Processed (596) - PNRP14_B.7.34_T238_SLIDE7_PIC4.jpg
Processed (597) - PNRP14_B.7.34_T247_SLIDE2_PIC2.jpg
Processed (598) - PNRP14_B.5.35_T110_SLIDE1_PIC2.jpg
Processed (599) - PNRP14_B.5.35.27_T281_SLIDE2_PIC1.jpg
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Processed (600) - PNRP14_B.5.35.27_T281_SLIDE3_PIC1.jpg
Processed (601) - PNRP14_B.5.35_T90_SLIDE1_PIC2.jpg
Processed (602) - PNRP14_B.5.15_T22_SLIDE7_PIC1.jpg
Processed (603) - PNRP14_B.7.19.56_T192_SLIDE4_PIC4.jpg
Processed (604) - PNRP14_B.5.15_T22_SLIDE7_PIC3.jpg
Processed (605) - PNRP12_B.5.15_T262_SLIDE2_PIC4.jpg
Processed (606) - PNRP14_B.5.35_T73_SLIDE5_PIC2.jpg
Processed (607) - PNRP12_B.5.15_T262_SLIDE3_PIC4.jpg
Processed (608) - PNRP14_B.5.35_T73_SLIDE4_PIC2.jpg
Processed (609) - PNRP14_B.5.35.27_T281_SLIDE2_PIC3.jpg
Processed (610) - PNRP14_B.5.35.27_T281_SLIDE3_PIC3.jpg
Processed (611) - PNRP14_B.7.27_T210_SLIDE1_PIC14.jpg
Processed (612) - PNRP14_B.5.35_T93_SLIDE3_PIC2.jpg
Processed (613) - PNRP14_B.5.4_T113_SLIDE6_PIC1.jpg
Processed (614) - PNRP14_B.5.35_T59_SLIDE3_PIC1.jpg
Processed (615) - PNRP14_B.5.35_T59_SLIDE2_PIC1.jpg
Processed (616) - PNRP12_B.4.22_T10_SLIDE2_PIC5.jpg
Processed (617) - PNRP14_B.5.32.115_T33_SLIDE3_PIC2.jpg
Processed (618) - PNRP14_B.7.34_T245_SLIDE3_PIC8.jpg
Processed (619) - PNRP12_B.4.22_T10_SLIDE3_PIC5.jpg
Processed (620) - PNRP14_B.5.35_T105_SLIDE3_PIC1.jpg
Processed (621) - PNRP14_B.5.35_T105_SLIDE2_PIC1.jpg
Processed (622) - PNRP14_B.7.33_T228_SLIDE3_PIC2.jpg
Processed (623) - PNRP14_B.7.33_T228_SLIDE2_PIC2.jpg
Processed (624) - PNRP14_B.7.19.56_T194_SLIDE2_PIC2.jpg
Processed (625) - PNRP14_B.7.34_T248_SLIDE2_PIC2.jpg
Processed (626) - PNRP14_B.7.19.56_T194_SLIDE3_PIC2.jpg
Processed (627) - PNRP12_B.5.15_T26_SLIDE2_PIC1.jpg
Processed (628) - PNRP12_B.5.15_T26_SLIDE3_PIC1.jpg
Processed (629) - PNRP14_B.6.42_T276_SLIDE2_PIC3.jpg
Processed (630) - PNRP14_B.5.35_T85_SLIDE3_PIC1.jpg
Processed (631) - PNRP14_B.5.35_T85_SLIDE2_PIC1.jpg
Processed (632) - PNRP14_B.7.33_T232_SLIDE1_PIC1.jpg
Processed (633) - PNRP14_B.7.20_T202_SLIDE2_PIC1.jpg
Processed (634) - PNRP14_B.5.34_T59_SLIDE3_PIC1.jpg
Processed (635) - PNRP14_B.6.42_T276_SLIDE2_PIC2.jpg
Processed (636) - PNRP14_B.7.34_T248_SLIDE2_PIC3.jpg
Processed (637) - PNRP14_B.7.19.56_T194_SLIDE3_PIC3.jpg
Processed (638) - PNRP14_B.7.19.56_T194_SLIDE2_PIC3.jpg
Processed (639) - PNRP14_B.7.33_T228_SLIDE2_PIC3.jpg
Processed (640) - PNRP14_B.6.44_T165_SLIDE4_PIC1.jpg
Processed (641) - PNRP12_B.5.17_T29_SLIDE2_PIC1.jpg
Processed (642) - PNRP12_B.4.22_T10_SLIDE3_PIC4.jpg
Processed (643) - PNRP14_B.5.32.115_T33_SLIDE3_PIC3.jpg
Processed (644) - PNRP12_B.4.22_T10_SLIDE2_PIC4.jpg
Processed (645) - PNRP14_B.7.31_T219_SLIDE2_PIC1.jpg
Processed (646) - PNRP14_B.7.31_T219_SLIDE3_PIC1.jpg
Processed (647) - PNRP14_B.6.44_T164_SLIDE3_PIC1.jpg
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Processed (648) - PNRP14_B.7.27_T210_SLIDE1_PIC15.jpg
Processed (649) - PNRP14_B.7.34_T247_SLIDE3_PIC1.jpg
Processed (650) - PNRP14_B.7.34_T247_SLIDE2_PIC1.jpg
Processed (651) - PNRP14_B.5.35_T110_SLIDE1_PIC1.jpg
Processed (652) - PNRP12_B.5.31_T259_SLIDE3_PIC2.jpg
Processed (653) - PNRP14_B.5.35_T73_SLIDE5_PIC3.jpg
Processed (654) - PNRP14_B.5.35_T90_SLIDE1_PIC1.jpg
Processed (655) - PNRP14_B.5.15_T22_SLIDE7_PIC2.jpg
Processed (656) - PNRP14_B.6.43_T152_SLIDE2_PIC2.jpg
Processed (657) - TOMB2_BURIAL4_T257_SLIDE4_PIC3.jpg
Processed (658) - PNRP12_B.5.15_T262_SLIDE2_PIC1.jpg
Processed (659) - PNRP12_B.5.15_T262_SLIDE3_PIC1.jpg
Processed (660) - PNRP12_B.5.15_T23_SLIDE6_PIC2.jpg
Processed (661) - PNRP12_B.4.17_T282_SLIDE4_PIC2.jpg
Processed (662) - PNRP12_B.6.10.35_T135_SLIDE3_PIC3.jpg
Processed (663) - PNRP14_B.6.34_T143_SLIDE4_PIC2.jpg
Processed (664) - PNRP12_B.6.10.35_T135_SLIDE2_PIC3.jpg
Processed (665) - PNRP12_B.5.15_T23_SLIDE7_PIC2.jpg
Processed (666) - PNRP14_B.5.34_T51_SLIDE2_PIC3.jpg
Processed (667) - PNRP14_B.6.44_T165_SLIDE5_PIC11.jpg
Processed (668) - PNRP14_B.5.34_T51_SLIDE3_PIC3.jpg
Processed (669) - PNRP14_B.7.31_T272_SLIDE3_PIC2.jpg
Processed (670) - PNRP14_B.5.35_T59_SLIDE2_PIC4.jpg
Processed (671) - PNRP14_B.6.37_T147_SLIDE3_PIC3.jpg
Processed (672) - PNRP14_B.7.31_T222_SLIDE4_PIC1.jpg
Processed (673) - PNRP14_B.6.37_T147_SLIDE2_PIC3.jpg
Processed (674) - PNRP14_B.7.31_T222_SLIDE5_PIC1.jpg
Processed (675) - PNRP14_B.6.44_T165_SLIDE4_PIC5.jpg
Processed (676) - PNRP14_B.6.44_T165_SLIDE5_PIC5.jpg
Processed (677) - PNRP12_B.5.17_T29_SLIDE3_PIC5.jpg
Processed (678) - PNRP12_B.4.23_T12_SLIDE7_PIC3.jpg
Processed (679) - TOMB2_COMMINGLED_T251_SLIDE1_PIC1.jpg
Processed (680) - PNRP14_B.7.27_T210_SLIDE2_PIC3.jpg
Processed (681) - PNRP14_B.7.19.56_T194_SLIDE2_PIC7.jpg
Processed (682) - PNRP14_B.5.35_T85_SLIDE3_PIC4.jpg
Processed (683) - PNRP14_B.7.33_T232_SLIDE1_PIC4.jpg
Processed (684) - PNRP14_B.5.35_T85_SLIDE2_PIC4.jpg
Processed (685) - PNRP12_B.5.15_T26_SLIDE3_PIC4.jpg
Processed (686) - PNRP14_B.7.20_T205_SLIDE2_PIC1.jpg
Processed (687) - PNRP14_B.7.33_T235_SLIDE1_PIC1.jpg
Processed (688) - PNRP14_B.5.35_T85_SLIDE2_PIC5.jpg
Processed (689) - PNRP14_B.5.34_T59_SLIDE3_PIC4.jpg
Processed (690) - PNRP14_B.7.19.56_T194_SLIDE2_PIC6.jpg
Processed (691) - PNRP14_B.7.27_T210_SLIDE2_PIC2.jpg
Processed (692) - PNRP12_B.4.23_T12_SLIDE7_PIC2.jpg
Processed (693) - PNRP12_B.5.17_T29_SLIDE3_PIC4.jpg
Processed (694) - PNRP12_B.4.22_T10_SLIDE3_PIC1.jpg
Processed (695) - PNRP12_B.4.22_T10_SLIDE2_PIC1.jpg
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Processed (696) - PNRP14_B.6.37_T147_SLIDE2_PIC2.jpg
Processed (697) - PNRP14_B.6.37_T147_SLIDE3_PIC2.jpg
Processed (698) - PNRP14_B.6.44_T164_SLIDE3_PIC4.jpg
Processed (699) - PNRP14_B.7.19.57_T194_SLIDE5_PIC3.jpg
Processed (700) - PNRP14_B.6.28_T132_SLIDE1_PIC4.jpg
Processed (701) - PNRP14_B.5.34_T51_SLIDE3_PIC2.jpg
Processed (702) - PNRP14_B.7.31_T219_SLIDE2_PIC4.jpg
Processed (703) - PNRP14_B.5.34_T51_SLIDE2_PIC2.jpg
Processed (704) - PNRP14_B.6.44_T165_SLIDE5_PIC10.jpg
Processed (705) - PNRP14_B.7.27_T211_SLIDE4_PIC2.jpg
Processed (706) - PNRP14_B.6.34_T143_SLIDE4_PIC3.jpg
Processed (707) - PNRP14_B.7.32_T226_SLIDE3_PIC1.jpg
Processed (708) - PNRP12_B.5.15_T23_SLIDE7_PIC3.jpg
Processed (709) - PNRP12_B.6.10.35_T135_SLIDE2_PIC2.jpg
Processed (710) - PNRP12_B.4.17_T282_SLIDE4_PIC3.jpg
Processed (711) - PNRP12_B.6.10.35_T135_SLIDE3_PIC2.jpg
Processed (712) - PNRP14_B.7.32_T226_SLIDE2_PIC1.jpg
Processed (713) - PNRP14_B.6.43_T151_SLIDE1_PIC1.jpg
Processed (714) - PNRP14_B.5.35_T94_SLIDE3_PIC2.jpg
Processed (715) - PNRP12_B.4.22_T11_SLIDE5_PIC1.jpg
Processed (716) - TOMB2_BURIAL4_T257_SLIDE4_PIC2.jpg
Processed (717) - PNRP14_B.6.43_T152_SLIDE2_PIC3.jpg
Processed (718) - PNRP14_B.6.38_T275_SLIDE4_PIC2.jpg
Processed (719) - PNRP14_B.7.19.56_T192_SLIDE4_PIC2.jpg
Processed (720) - PNRP14_B.6.43_T152_SLIDE2_PIC1.jpg
Processed (721) - PNRP14_B.6.43_T152_SLIDE3_PIC1.jpg
Processed (722) - PNRP12_B.5.15_T262_SLIDE3_PIC2.jpg
Processed (723) - PNRP12_B.5.15_T262_SLIDE2_PIC2.jpg
Processed (724) - PNRP14_B.7.27_T210_SLIDE1_PIC12.jpg
Processed (725) - PNRP12_B.5.15_T23_SLIDE7_PIC1.jpg
Processed (726) - PNRP14_B.7.32_T226_SLIDE3_PIC3.jpg
Processed (727) - PNRP14_B.6.34_T143_SLIDE4_PIC1.jpg
Processed (728) - PNRP12_B.5.15_T23_SLIDE6_PIC1.jpg
Processed (729) - PNRP12_B.4.17_T282_SLIDE4_PIC1.jpg
Processed (730) - PNRP14_B.6.44_T165_SLIDE5_PIC12.jpg
Processed (731) - PNRP14_B.6.31_T141_SLIDE1_PIC2.jpg
Processed (732) - PNRP14_B.7.19.57_T194_SLIDE4_PIC1.jpg
Processed (733) - PNRP14_B.7.19.57_T194_SLIDE5_PIC1.jpg
Processed (734) - PNRP14_B.6.44_T164_SLIDE3_PIC6.jpg
Processed (735) - PNRP14_B.7.31_T222_SLIDE5_PIC2.jpg
Processed (736) - PNRP12_B.4.22_T10_SLIDE3_PIC3.jpg
Processed (737) - PNRP12_B.4.22_T10_SLIDE2_PIC3.jpg
Processed (738) - TOMB2_COMMINGLED_T251_SLIDE1_PIC2.jpg
Processed (739) - PNRP12_B.5.17_T29_SLIDE3_PIC6.jpg
Processed (740) - PNRP14_B.7.19.56_T194_SLIDE3_PIC4.jpg
Processed (741) - PNRP14_B.7.19.56_T194_SLIDE2_PIC4.jpg
Processed (742) - PNRP12_B.4.22_T10_SLIDE6_PIC9.jpg
Processed (743) - PNRP14_B.7.33_T235_SLIDE1_PIC3.jpg
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Processed (744) - PNRP14_B.7.33_T235_SLIDE1_PIC2.jpg
Processed (745) - PNRP12_B.4.22_T10_SLIDE6_PIC8.jpg
Processed (746) - PNRP14_B.7.19.56_T194_SLIDE2_PIC5.jpg
Processed (747) - PNRP12_B.4.23_T12_SLIDE6_PIC1.jpg
Processed (748) - PNRP14_B.7.27_T210_SLIDE2_PIC1.jpg
Processed (749) - PNRP12_B.4.23_T12_SLIDE7_PIC1.jpg
Processed (750) - PNRP14_B.6.44_T165_SLIDE5_PIC7.jpg
Processed (751) - PNRP12_B.4.22_T10_SLIDE2_PIC2.jpg
Processed (752) - PNRP12_B.4.22_T10_SLIDE3_PIC2.jpg
Processed (753) - PNRP14_B.6.37_T147_SLIDE3_PIC1.jpg
Processed (754) - PNRP14_B.5.34_T51_SLIDE2_PIC1.jpg
Processed (755) - PNRP14_B.7.27_T211_SLIDE4_PIC1.jpg
Processed (756) - PNRP14_B.5.34_T51_SLIDE3_PIC1.jpg
Processed (757) - PNRP12_B.6.10.35_T135_SLIDE3_PIC1.jpg
Processed (758) - PNRP14_B.7.32_T226_SLIDE3_PIC2.jpg
Processed (759) - PNRP14_B.7.27_T210_SLIDE1_PIC13.jpg
Processed (760) - PNRP12_B.6.10.35_T135_SLIDE2_PIC1.jpg
Processed (761) - PNRP14_B.5.35_T94_SLIDE3_PIC1.jpg
Processed (762) - PNRP12_B.5.15_T262_SLIDE2_PIC3.jpg
Processed (763) - TOMB2_BURIAL4_T257_SLIDE4_PIC1.jpg
Processed (764) - PNRP12_B.5.15_T262_SLIDE3_PIC3.jpg
Processed (765) - TOMB2_BURIAL4_T257_SLIDE5_PIC1.jpg
Processed (766) - PNRP14_B.6.38_T275_SLIDE4_PIC1.jpg
Processed (767) - PNRP14_B.5.35_T79_SLIDE1_PIC1.jpg
Processed (768) - PNRP14_B.7.19.56_T192_SLIDE4_PIC1.jpg
```

13 Creating bins and finding if accuracy of the model improves as confidence of region increases

```python
import pandas as pd
import numpy as np

predict_data = pd.read_csv('annulation_predictions.csv')
actual_data = pd.read_csv('image_annulation.csv')

combined_data = pd.merge(predict_data, actual_data, on='File Name', how='left')

bin_ranges = [[0.50, 0.60], [0.60, 0.70],[0.70, 0.80], [0.80, 0.90], [0.90, 1]]

results = []

for range in bin_ranges:
    bin_data = combined_data[combined_data['Region Confidence'] >= range[0]]
    bin_data = bin_data[bin_data['Region Confidence'] < range[1]]
    errors = np.abs(bin_data['Predicted Annulation Count'] - bin_data['Actual␣
  ↪Annulations'])
```

```
    mae = errors.mean()
    rmse = np.sqrt((errors ** 2).mean())

    accuracy_within_1 = (errors <= 1).mean()  # Percentage of predictions␣
    ↪within ±1
    accuracy_within_2 = (errors <= 2).mean()
    accuracy_within_5 = (errors <= 5).mean()
    accuracy_within_7 = (errors <= 7).mean()
    accuracy_within_10 = (errors <= 10).mean()
    accuracy_within_15 = (errors <= 15).mean()
    accuracy_within_20 = (errors <= 20).mean()

    accuracy_between_1_and_5 = ((errors > 1) & (errors <= 5)).mean()
    accuracy_between_5_and_7 = ((errors > 5) & (errors <= 7)).mean()
    accuracy_between_7_and_10 = ((errors > 7) & (errors <= 10)).mean()

    results.append({
        'Threshold Range': range,
        'MAE': mae,
        'RMSE': rmse,
        'Accuracy ±1': accuracy_within_1,
        'Accuracy 1-5': accuracy_between_1_and_5,
        'Accuracy 5-7': accuracy_between_5_and_7,
        'Accuracy 7-10': accuracy_between_7_and_10,
        'Accuracy within 10': accuracy_within_10,
        'Accuracy within 15': accuracy_within_15,
        'Accuracy within 20': accuracy_within_20
    })

results_df = pd.DataFrame(results)
results_df
```

	Threshold Range	MAE	RMSE	Accuracy ±1	Accuracy 1-5
0	[0.5, 0.6]	9.183280	11.339231	0.052632	0.263158
1	[0.6, 0.7]	9.767079	12.603365	0.040816	0.306122
2	[0.7, 0.8]	9.462636	12.008867	0.065421	0.233645
3	[0.8, 0.9]	9.581816	11.837985	0.068063	0.230366
4	[0.9, 1]	10.386872	13.240447	0.094276	0.205387

	Accuracy 5-7	Accuracy 7-10	Accuracy within 10	Accuracy within 15
0	0.131579	0.157895	0.605263	0.842105
1	0.061224	0.183673	0.591837	0.755102
2	0.102804	0.233645	0.635514	0.785047
3	0.109948	0.196335	0.604712	0.798429
4	0.134680	0.134680	0.569024	0.723906

```
   Accuracy within 20
0            0.921053
1            0.897959
2            0.934579
3            0.918848
4            0.845118
```

13.1 Results of Above Statistics

It seems that all of the threshold ranges of annulation region confidence return a similar estimation accuracy. When the confidence is between 0.9 and 1, the percentage of estimations within 1 annulation is around 10%, which is the highest among the rest in that area. From there, it does not seem that the highest region confidence produces the best estimation. At the end, around 60% of all estimations within each respective threshold range are accurate within 10 annulations.

The test MAE for the model was 10.90 which means that on average the model is wrong by 10.9 annulations. This means that some estimations will be more close to the true number than 10.9, some will be less close than 10.9 as well. Just the average error is 10.9. We can see above that 9.4% of image estimations with high confidence annulation regions produce estimations with good precision.

I would recommend that this code be re-run with unseen data of similar quality since the model has seen some of the data during training.