

In [38]:

```
import PIL
from sklearn.datasets import fetch_lfw_people
faces = fetch_lfw_people(min_faces_per_person=60)
print(faces.target_names)
print(faces.images.shape)

['Ariel Sharon' 'Colin Powell' 'Donald Rumsfeld' 'George W Bush'
 'Gerhard Schroeder' 'Hugo Chavez' 'Junichiro Koizumi' 'Tony Blair']
(1348, 62, 47)
```

In [39]:

```
import matplotlib.pyplot as plt
fig, ax = plt.subplots(3, 3)
for i, axi in enumerate(ax.flat):
    axi.imshow(faces.images[i], cmap='bone')
    axi.set(xticks=[], yticks=[],
            xlabel=faces.target_names[faces.target[i]])
```



In [40]:

```
from sklearn.svm import SVC
from sklearn.decomposition import RandomizedPCA
from sklearn.pipeline import make_pipeline
pca = RandomizedPCA(n_components=150, whiten=True, random_state=42)
svc = SVC(kernel='rbf', class_weight='balanced')
model = make_pipeline(pca, svc)
```

c:\users\lenovo\appdata\local\programs\python\python36\lib\site-packages\sklearn\utils\deprecation.py:58: DeprecationWarning: Class RandomizedPCA is deprecated; RandomizedPCA was deprecated in 0.18 and will be removed in 0.20. Use PCA(svd_solver='randomized') instead. The new implementation DOES NOT store whiten ``components_``. Apply transform to get them.
warnings.warn(msg, category=DeprecationWarning)

In [41]:

```
from sklearn.cross_validation import train_test_split
Xtrain, Xtest, ytrain, ytest = train_test_split(faces.data, faces.target,
random_state=42)
```

In [42]:

```
from sklearn.grid_search import GridSearchCV
param_grid = {'svc__C': [1, 5, 10, 50],
'svc__gamma': [0.0001, 0.0005, 0.001, 0.005]}
grid = GridSearchCV(model, param_grid)
%time grid.fit(Xtrain, ytrain)
print(grid.best_params_)
```

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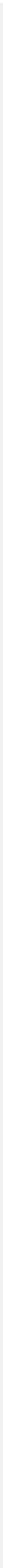
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```

Wall time: 36.8 s

```
{'svc__C': 5, 'svc__gamma': 0.001}
```


In [46]:

```
from sklearn.metrics import confusion_matrix
import seaborn as sns; sns.set()
mat = confusion_matrix(ytest, yfit)
sns.heatmap(mat.T, square=True, annot=True, fmt='d', cbar=False,
xticklabels=faces.target_names,
yticklabels=faces.target_names)
plt.xlabel('true label')
plt.ylabel('predicted label');
```

