

# CS 148 Final Project

**The Troubles – an attempt at a human face**

*Joseph Paavola – solo project*

## Project Requirements

### Leveraging ray tracing

Accurate ray traced subsurface scattering was critical for the skin material.

Hair shaders also took advantage of ray tracing transmission.

The eyeball used transmission for the cornea.

### All geometry modeled from scratch

**Head:** modeled from scratch using contour sketch based on reference head model (see citations). Subdivided basic low poly mesh with multires modifier for sculpting. Sculpted head shape, skin folds, wrinkles, and details on the eyes and lips.

**Eyeballs:** modeled with basic meshes for the sclera, cornea, iris, and pupil.

**Hat:** modeled by sculpting a half-sphere mesh with multires.

**Background:** used match photo modeling for street. Modeled newspaper as a slighted deformed image plane using sculpting.

### UV mapping

**Head:** UV unwrapped for hand painted texture masks. UV placement was guided by reference model.

**Eyeballs:** UV unwrapped as spheres for the sclera and plane projections for the irises.

**Hat:** Marked seams and unwrapped as multiple triangular meshes.

**Background:** Plane projections used for background and newspaper.

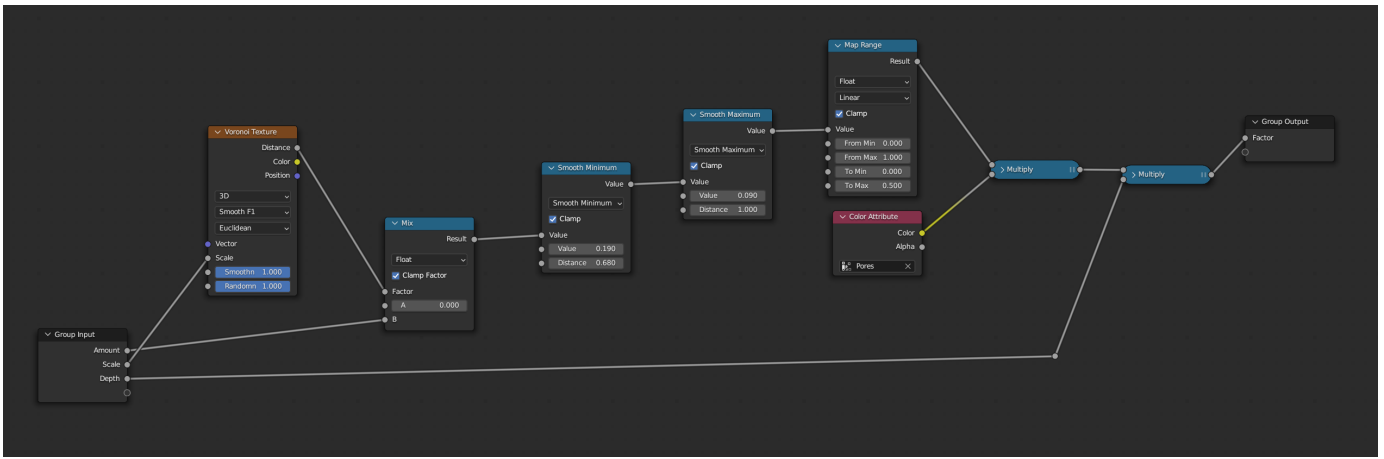
### Texturing

Skin texture was procedurally generated with various vornoi and simple noise textures. These were blended and overlayed to create skin color variation, a pore normal map, and blotches in the skin. Hand painted texture maps were used to create masks and color modifications in the face.

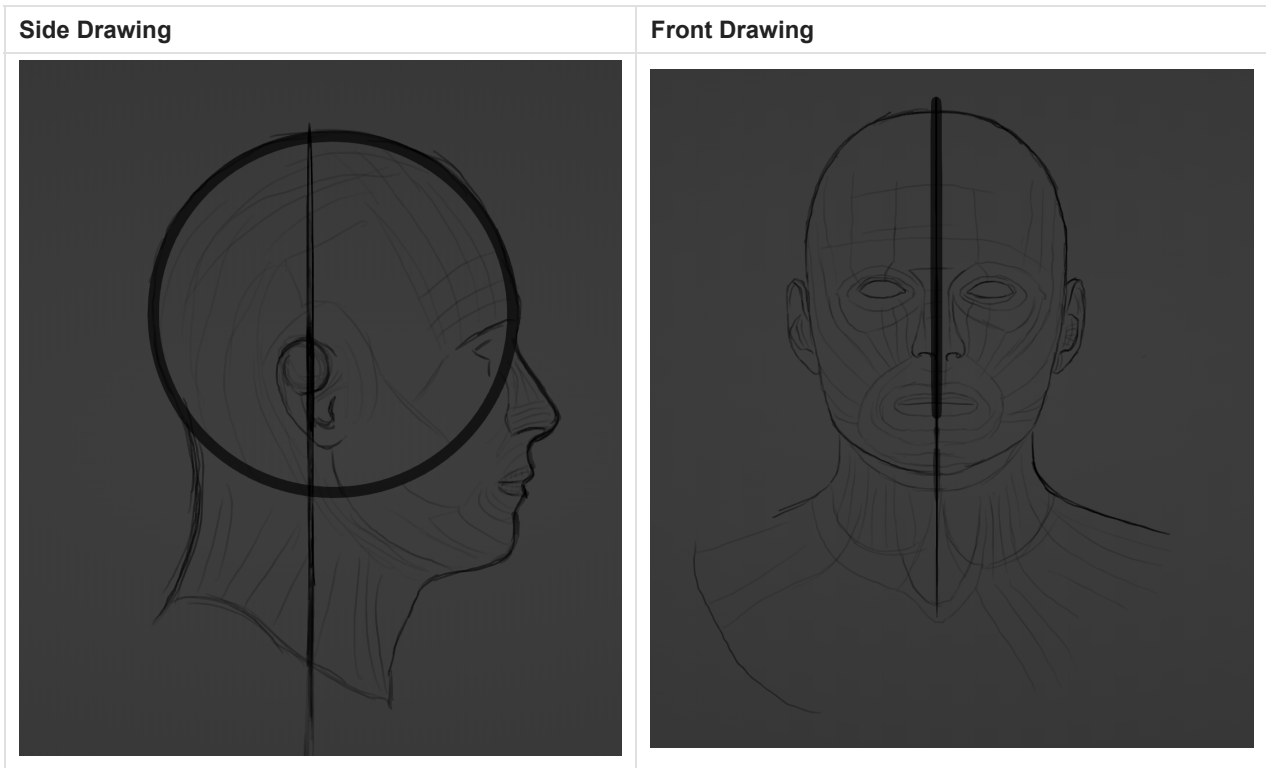
### Advanced Feature

Depth of field was used to blend background objects into portrait.

Three hair particle systems were used, for the eyebrows, the eyelashes, and stubble.



Example part of skins shader: pores generated with vornoi texture



Silhouettes and contour traces used for modeling base head mesh

# Citations

## Head model reference

- <https://blendswap.com/blend/22220>
- Used to guide drawing of grease-pencil silhouette for modeling (see above)
- Used to determine poles for modeling to keep good topology
- DID NOT use reference mesh directly, modeled my base mesh from scratch

## Textures

- Background alley texture from Textures.com (BuildingsHouseOld0339)
- Hat texture from Textures.com (Fabric\_Tweed3\_Closeup)
- Newspaper texture  
Winchester S. 13 killed as paratroops break riot. *The Guardian (1959-2003)*. Jan 31 1972:1. Available from: <https://www.proquest.com/historical-newspapers/13-killed-as-paratroops-break-riot/docview/185584302/se-2>.

## Eyebrows

- Used a couple parts of the workflow from [this tutorial](#)

## Eye

- Used [textures](#) from this YouTube video description

## Reference Pictures

- Used various pictures for reference while sculpting, all in the `ref` folder of the Box link