The only thing that remains to be proved is that $\mu^{(g)}$ is generically one to one. But this is clear: by Abel's theorem the fiber of $\mu^{(g)}$ over any point $\lambda \in \mathcal{J}(S)$ consists of the set $|D|$ of effective divisors linearly equivalent to any divisor $D \in \mu^{(g)^{-1}}(\lambda)$, which is a projective space.

⊢ By Abel's theorem, if $\mu^{(g)}(D) = \mu^{(g)}(D')$, then $\exists$ a meromorphic function f on S s.t. $D = D' + (f)$.
For, $\mu^{(g)}(D) = \mu(D - gP_0) = \mu^{(g)}(D') = \mu(D' - gP_0)$.
$\Rightarrow$ By Abel's theorem, $D - gp_0 = D' - gp_0 + (f)$ for some meromorphic function f on S. $\Rightarrow$ $D = D' + (f)$.
$D \in S^{(g)}$ $\Rightarrow$ D is an effective divisor. $\Rightarrow$ The fiber of $\mu^{(g)}$ over any point $\lambda \in \mathcal{J}(S) = |D| \cong \mathbb{P}(H^0(S, \mathcal{O}(D)))$, see p.137. ⊣

On the other hand, by dimension considerations the generic fiber of $\mu^{(g)}$ is 0-dimensional; it follows that the generic fiber of $\mu^{(g)}$ is one point. (The map $\mu^{(g)}$ is an example of a birational map; we shall discuss these in detail in Chapter 4.) Q.E.D.

⊢ $\mu^{(g)} : S^{(g)} \longrightarrow \mathcal{J}(S) = \mathbb{C}^g/\Lambda$ $\Rightarrow$ $\dim(\mathcal{J}(S)) = g$
and $\dim(S^{(g)}) = g$ $\Rightarrow$ $\mu^{(g)}$ is non-singular at generic points. $\Rightarrow$ dim fiber + $\dim \mathcal{J}(S) = \dim S^{(g)}$. $\Rightarrow$ dim fiber = 0 at