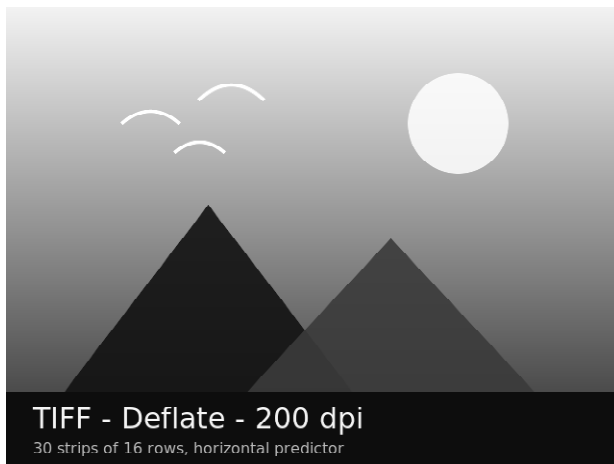


A TIFF, and the strips it is made of

A TIFF is a directory of tags and a list of strips - bands of the picture, each compressed on its own. The file below is a 640 by 480 greyscale scan at 200 dpi, Deflate-compressed with a horizontal predictor, sixteen rows to the strip. It is embedded and placed like any other picture; what the format costs is visible only in what the file comes out as, and in the two numbers [image info] adds for it.



placed with neither -width nor -dpi: 81.28 x 60.96 mm

image info	answers
type	tiff
width	640
height	480
bitDepth	8
components	1
compression	deflate
strips	30
rowsPerStrip	16
space	DeviceGray
xResolution	200.0
resolution	XResolution

The resolution is not a comfort entry. A pixel is 1/dpi of an inch, so this picture is 81.28 mm wide; read as 72 dpi, which is what a file that states nothing gets, the same 640 pixels would be 226 mm and would not fit on the sheet. A scanned fax page - 1728 pixels at the 200 dpi of the fax line - is 219 mm of paper and 610 mm at 72.

Thirty strips, thirty image XObjects

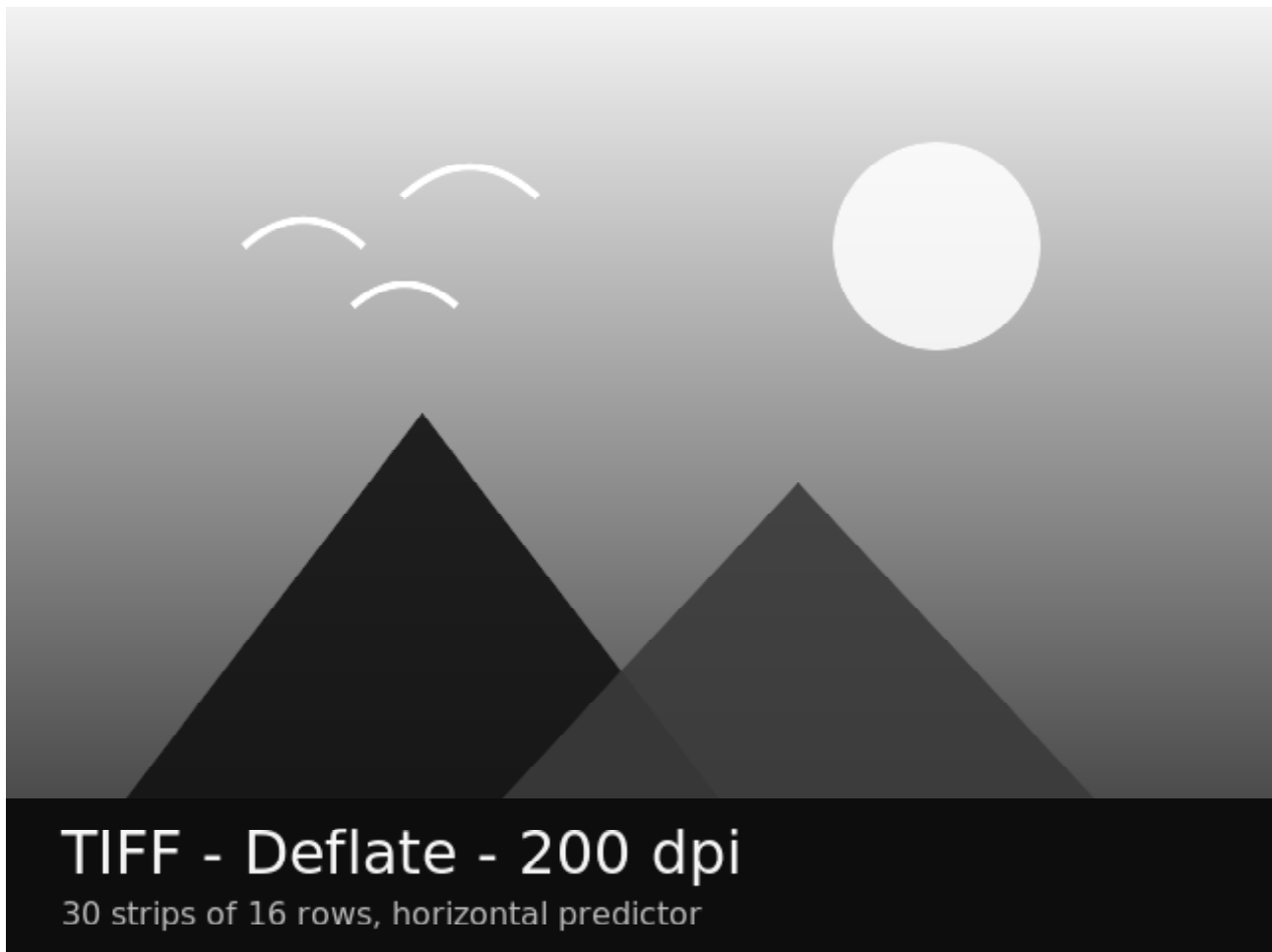
Deflate begins afresh in every strip: a zlib stream ends where the strip ends. So the strips cannot be concatenated, and each one becomes an image XObject of its own, 30 of them here, each 16 rows tall. [image place] puts them back together as 30 cm/Do pairs inside the one q ... Q of the placement - no form XObject around them, so a TIFF of one strip can still be another picture's soft mask. Uncompressed and PackBits strips carry no state and are joined into a single stream, and LZW is stateless once it has been unpacked, so those files arrive as one image.

```
pdfimages -list 03.08-image-tiff.pdf
```

```
qpdf --qdf --object-streams=disable 03.08-image-tiff.pdf - | grep -c ' Do'
```

Where the strips meet

The same file again, enlarged to 170 mm - two and an eighth times its own size - so that the boundaries between the parts can be looked for. Every 16 image rows is a new XObject, which on this page is one every 5.67 mm. Each part carries the rows it holds and no others: no row is drawn twice and none is left out, which is what makes the picture come together rather than drift apart over thirty placements.



What a stack cannot be

A mask is one image: the Mask and SMask entries of an image dictionary name a single image XObject (ISO 32000-2, Table 87 and Table 143). A picture that is thirty of them therefore cannot be one, and cannot wear one either - the mask would be drawn over each part in turn instead of over the picture. Asked for it anyway, tclpdf refuses by name. The refusal below was caught with try/trap and is printed as it came:

```
-errorcode TCLPDF TIFF STACKED
```

tclpdf: "scan" is a deflate-compressed TIFF in 30 strips, and a compression that begins afresh in every strip becomes one image XObject per strip, and a mask is ONE image - the Mask and SMask entries of an image dictionary name a single image XObject (ISO 32000-2, Table 87 and Table 143); re-save it with RowsPerStrip 480, which puts the whole picture in one strip, or mask with a PNG

The way out is named in the message and is the same one for all three refusals a stack can produce - the third is a strip count above 256, where the picture is refused rather than stacked: re-save the file with a RowsPerStrip that holds the whole picture, and it becomes one image again.