COOKED IN A VACUUM BAG FOR 20 MINUTES

RAW 50°C (122°F) | 51°C (124°F) | 53°C (127°F) | 55°C (131°F) | 57°C (135°F) | 59°C (138°F) | 60°C (140°F) | 61°C (142°F) | 63°C (145°F) | 65°C (149°F) | 67°C (153°F) | 69°C (156°F) | 71°C (160°F) | 72°C (162°F) **DRY**

This piece of meat was photographed over a minute after it was cut. Notice how much redder it is than it was immediately after it was cut (see Above photo). This cherry-red bleed-out is a typical characteristic of sous-vide and low temperature cooking.

36°C (97°F)	38°C (100°F)	40°C (104°F)	42°C (108°F)	44°C (111°F)	46°C (115°F)	48°C (118°F)	50°C (122°F)	52°C (126°F)	54°C (129°F)	56°C (133°F)	58°C (136°F)	60°C (140°F)	62°C (144°F)	64°C (147°F)

temperature

raw/fishy | good | too toothy | good | overcooked | dry

pre/post sear tests at 230°C (450°F)

increasing preference

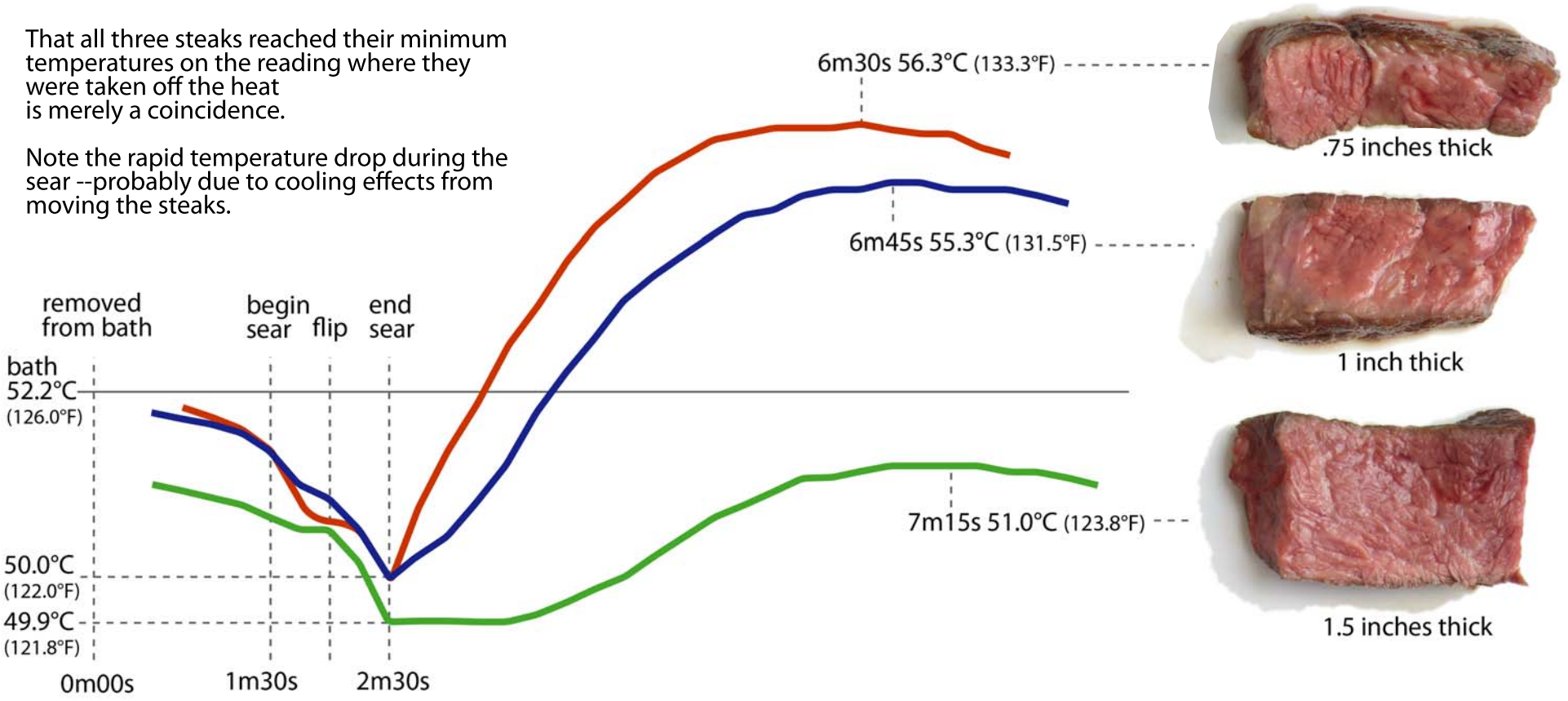
pre-seared 30 seconds per side	pre-seared 45 seconds per side	pre-seared one minute per side	no pre-sear post-seared 30 seconds per side	pre-seared 45 seconds per side post-seared 30 seconds per side

The effects of searing on different thicknesses of sous-vide steak:

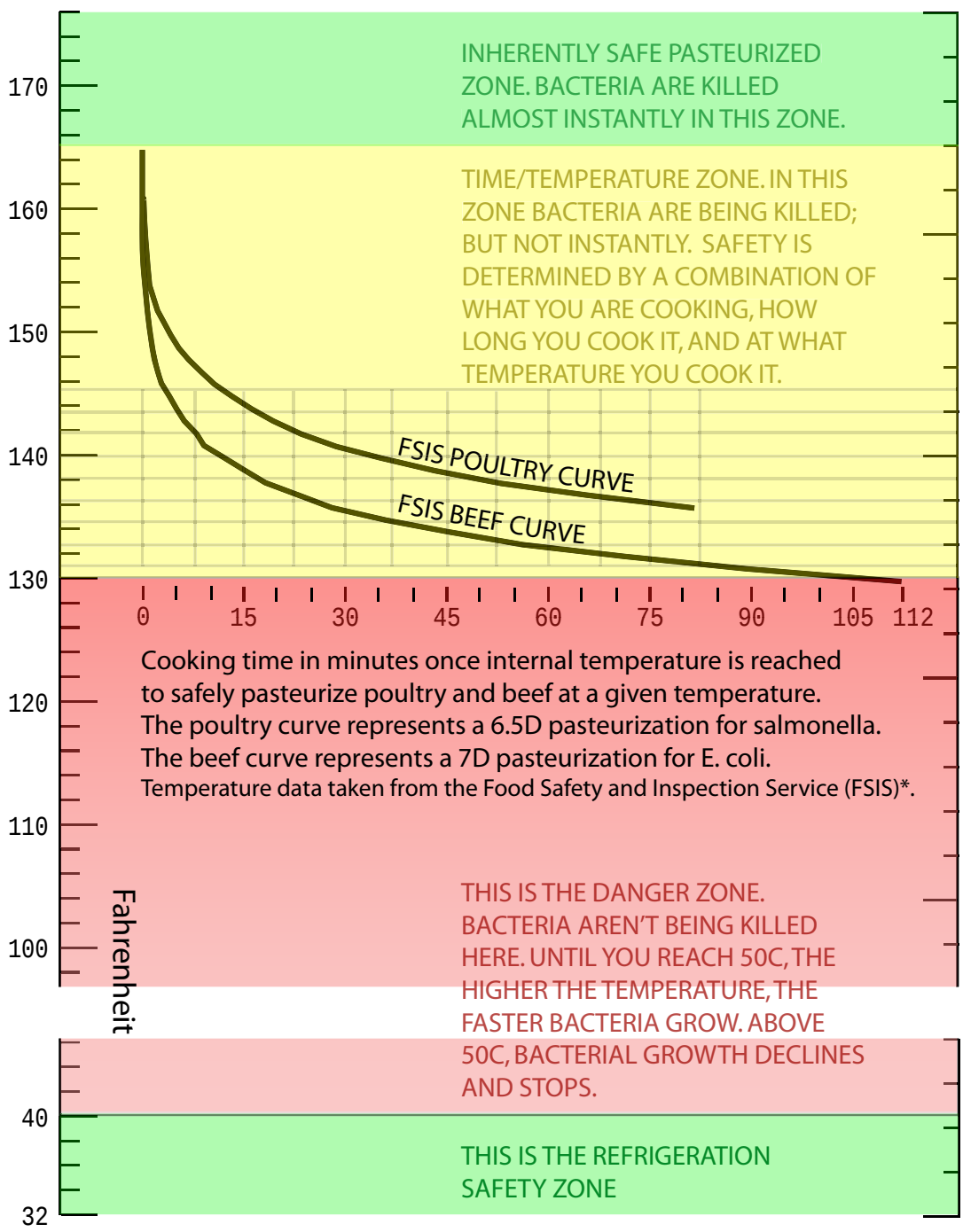
Three steaks with a surface area much larger than their thickness were vacuum packed without seasoning and heated in a circulating water bath held at 52.2°C (126.0°F). The steaks were removed from the bath after 1.25 hours, probed with a hypodermic thermocouple into the center, brushed with oil, seasoned with kosher salt, and seared for 30 seconds per side on a cast-iron pan heated to 316°C (600°F). While the steaks were being prepped for searing, they rested on a wooden cutting board in the kitchen. The ambient temperature of the kitchen was 34°C (93°F). Temperatures were recorded at intervals every 15 seconds, not continuously.

That all three steaks reached their minimum temperatures on the reading where they were taken off the heat is merely a coincidence.

Note the rapid temperature drop during the sear --probably due to cooling effects from moving the steaks.



BACTERIA AND SAFETY

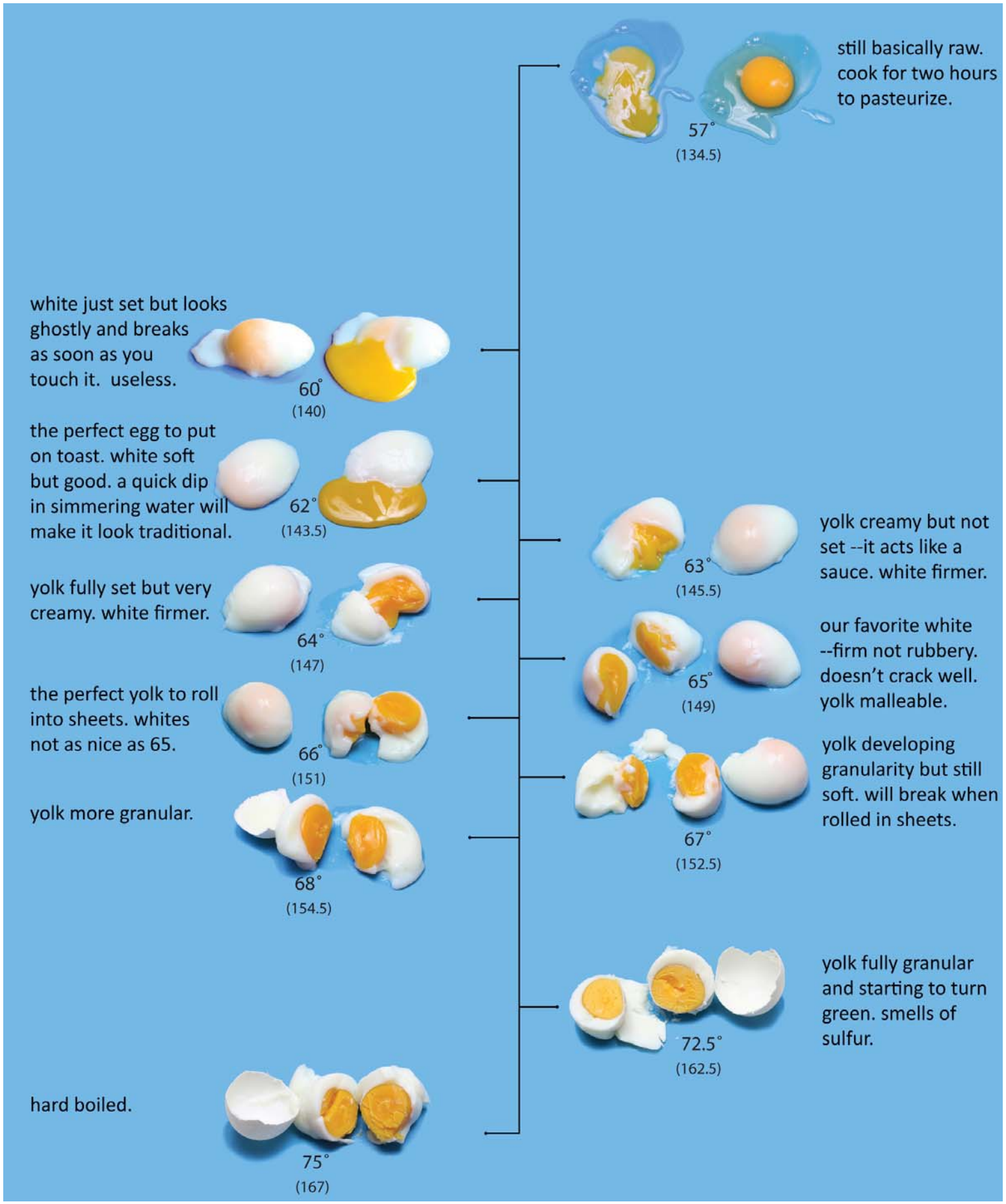


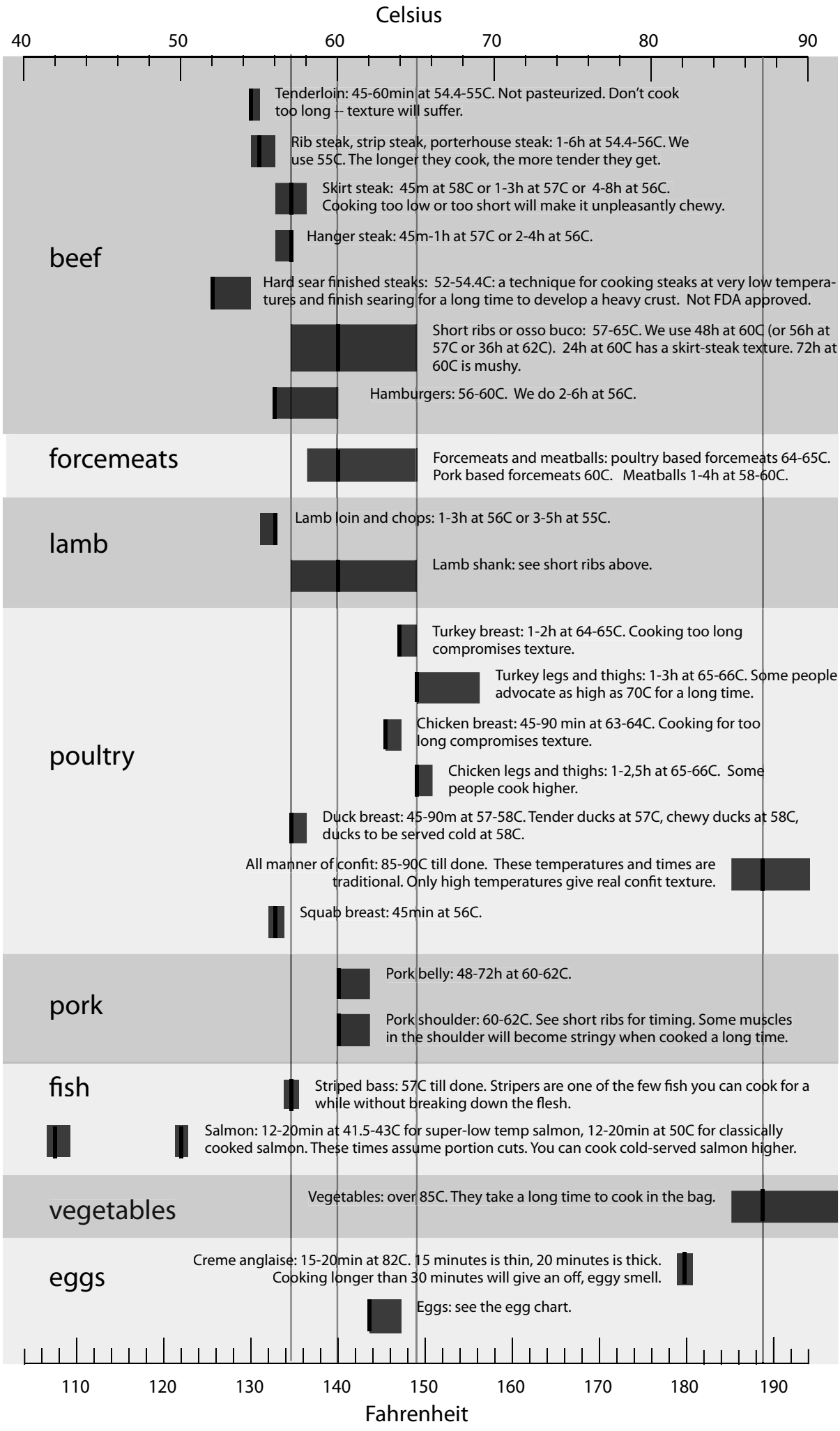
NOTES

- Food code safe poultry temperature. Instantly safe.
- Food code safe pork, ground beef, and eggs temperature. 15 seconds makes it safe.
- Food code safe roasts and steaks temperature. Safe in under a minute.
- FDA minimum hot-holding temperature.
- FSIS bacterial kill zone begins.
- Pathogen growth stops.**
- Bacterial spores germinate here on cooling.**

* http://www.fsis.usda.gov/oa/fr/95033F-a.htm and
http://www.fsis.usda.gov/OPPDE/rdad/FSISNotices/RTE_Poultry_Tables.pdf

** Bruno Goussault


still basically raw. cook for two hours to pasteurize.
57°
(134.5)
white just set but looks ghostly and breaks as soon as you touch it. useless.
60°
(140)
the perfect egg to put on toast. white soft but good. a quick dip in simmering water will make it look traditional.
62°
(143.5)
yolk creamy but not set --it acts like a sauce. white firmer.
63°
(145.5)
yolk fully set but very creamy. white firmer.
64°
(147)
our favorite white --firm not rubbery. doesn't crack well. yolk malleable.
65°
(149)
the perfect yolk to roll into sheets. whites not as nice as 65.
66°
(151)
yolk developing granularity but still soft. will break when rolled in sheets.
67°
(152.5)
yolk more granular.
68°
(154.5)
yolk fully granular and starting to turn green. smells of sulfur.
72.5°
(162.5)
hard boiled.
75°
(167)


Celsius
40
50
60
70
80
90
beef
Tenderloin: 45-60min at 54.4-55C. Not pasteurized. Don't cook too long -- texture will suffer.
Rib steak, strip steak, porterhouse steak: 1-6h at 54.4-56C. We use 55C. The longer they cook, the more tender they get.
Skirt steak: 45m at 58C or 1-3h at 57C or 4-8h at 56C. Cooking too low or too short will make it unpleasantly chewy.
Hanger steak: 45m-1h at 57C or 2-4h at 56C.
Hard sear finished steaks: 52-54.4C: a technique for cooking steaks at very low temperatures and finish searing for a long time to develop a heavy crust. Not FDA approved.
Short ribs or osso buco: 57-65C. We use 48h at 60C (or 56h at 57C or 36h at 62C). 24h at 60C has a skirt-steak texture. 72h at 60C is mushy.
Hamburgers: 56-60C. We do 2-6h at 56C.
forcemeats
Forcemeats and meatballs: poultry based forcemeats 64-65C. Pork based forcemeats 60C. Meatballs 1-4h at 58-60C.
lamb
Lamb loin and chops: 1-3h at 56C or 3-5h at 55C.
Lamb shank: see short ribs above.
poultry
Turkey breast: 1-2h at 64-65C. Cooking too long compromises texture.
Turkey legs and thighs: 1-3h at 65-66C. Some people advocate as high as 70C for a long time.
Chicken breast: 45-90 min at 63-64C. Cooking for too long compromises texture.
Chicken legs and thighs: 1-2,5h at 65-66C. Some people cook higher.
Duck breast: 45-90m at 57-58C. Tender ducks at 57C, chewy ducks at 58C, ducks to be served cold at 58C.
All manner of confit: 85-90C till done. These temperatures and times are traditional. Only high temperatures give real confit texture.
Squab breast: 45min at 56C.
pork
Pork belly: 48-72h at 60-62C.
Pork shoulder: 60-62C. See short ribs for timing. Some muscles in the shoulder will become stringy when cooked a long time.
fish
Striped bass: 57C till done. Stripers are one of the few fish you can cook for a while without breaking down the flesh.
Salmon: 12-20min at 41.5-43C for super-low temp salmon, 12-20min at 50C for classically cooked salmon. These times assume portion cuts. You can cook cold-served salmon higher.
vegetables
Vegetables: over 85C. They take a long time to cook in the bag.
eggs
Creme anglaise: 15-20min at 82C. 15 minutes is thin, 20 minutes is thick. Cooking longer than 30 minutes will give an off, eggy smell.
Eggs: see the egg chart.
110
120
130
140
150
160
170
180
190
Fahrenheit