THE GRAND MAP OF EATING: FOOD, TECHNOLOGY, AND ENGINEERING

Nomadic, hunter-gatherer lifestyle

Sun drying · Cooking · Grinding · Cutting

Bread
first food made by human over 30 000 years ago

Industrial food processing 1800 - 1900

1810 — **Canning invented** (Nicolas Appert)

1854 — **Ice making machine invented** (James Harrison)

1860 — **industrial milk processing, infant food** (Nestlé)

1864 — **Pasteurisation discovered** (louis Pasteur)

Margarine
first man made artificial food by the French Chemist Hippolyte Mège-Mouriès

1864 — HEINZ Standardized sauces and canned goods

1894 — Mechanized cereal production (Kellogg's)

Modern "Food technologist" 1900- 1950

1913 — **Electric fridge for homes was invented** (Fred Wolf)

1920 — **Fresh freezing invented** (Clarence Birdseye)

1934 — **First modern day pesticide, Thiram, was developed** (Paul Müller)

1945 — **Microwave invented** (Percy Spencor)

1946 — **First vacuum sealed sterilised packaging used to package milk** (Ruben Rausig)

Convenience Culture 1950 - 1970

Milling · Canning · Bottling

Early Industrialization of Food (1800–1880s)

Long lasting food

Natural relationship to ingredients

Natural variation

Fresh nutrient density

Food becomes *a product*, not just something cooked at home.

Psychological satisfaction from cooking and sharing meals

Intergenerational knowledge

Reduced reliance on personal labor

Cooking Skills

Time & Convenience

Less domestic labor

No need to spend hours cooking daily

Food literacy

Cultural recipes replaced by standardized products

Decline of communal meals

Home Cooking as a Cultural Practice

Families eating separately

Connection to seasonal cycles

Stable access to food during winter, war, crises

Food Safety & Preservation

Industrial standards reduce spoilage and pathogens

Preservatives · Emulsifiers · stabilizers · controlled nutritional profiles

Large food factories (canned meals, cereal, bread, chocolate)

Mass Food Processing & Branding (1900–1930s)

Cold storage infrustructure

Standardized packaging

Refrigerated rail transport

Biodiversity and traditional food cultures

Local food systems

Industrial standards reduce spoilage and pathogens

Cultural food identity

Global Availability & Affordability

lower cost due to mass-production methods

Biodiversity

Constant access to staples

Flash freezing preserves nutrients

Accessible food regardless of geography or season

TV DINNER
FIRST FULLY ENGINEERED MEAL

Swanson TV Dinners



More people fed, more consistently

Large-scale meal production

Terroir

Frozen, canned, and packaged foods last months

Compartmentalized metal trays (used inairline and military meals)

Wartime Mass-Meal Manufacturing (1940s)

Industrial portioning

Modular meals (Pre-portioned protein, vegetables, starches)

Modular ingredients lab-made fats, proteins, flavors

Massive upstream waste (factory surplus)

Logistics allow feeding cities and remote regions

Long shelf life

Less immediate waste

Environmental cost

Plastic pollution

Plastic waste from ready-to-eat meals

Manufacture Freshness

Industrial Freezing (1920s–1930s)

Environmental Sustainability

High energy use in freezing, processing, packaging

Monoculture crops (corn, soy, wheat) dominate diets

Potential climate benefits

Technological Innovation & Biotech Foods

New Innovations for future food security

BirdsEye develops frozen fish and vegetables the cold-chain system.

Potential to reduce animal agriculture

Health and metabolic stability

Rise of Processed Snack 1970 - 1990

1973 — **GMOs Invented** (Norman Ernest Borlaug, Herbert Boyer, Stanley Cohen)

Boxed mixes · **Frozen Lasagna** · **Frozen Pizza**

Ultraprocessed Food Era 2000 - 2010

- **Artificial flavours**
- **Emulsifiers**
- **Corn syrop**
- **MSG**
- **Engineered textures (crunch, melt)**
- **Highly refined ingredients**
- **Formulations**
- **lab-created mouth-feel and aromas**
- **food engineered to override satiety signals**
- **synthetic fats and flavor molecules**

Fortified foods (iodine, folic acid, vitamins) prevent deficiencies

Overreliance on engineered nutrients instead of whole-food

Medical prevention of malnutrition / diseases

Food Science & Nutrition Understanding

optimized fat–sugar–salt "bliss points"

Better understanding of macronutrients

Precise formulations possible

vanishing caloric density → overeating

Obesity/ Diabetis / Cardiovascular diseases

loss of food sovereignty

Satiety Signals

Natural Appetite Regulation

Emotional eating

Dependence on corporations for "basic foods"

food addiction behaviors

Long term health outcomes

nutrient-poor calorie-rich diets

Mental health issues

Food is less aligned with metabolism

New protein sources for growing populations

Laboratory / Biotech food 2010 -

2009 — Plant-based meat alternative products (BEYOND MEAT)

2011 — meat alternative products that mimic bloodiness, texture, and fat behavior (IMPOSSIBLE)

2016 — CRISPR enters food chain beginning of gene edited food

2017 — lab-grown chicken and beef prototypes (BIRDSEYE)

2020 — first non-animal dairy made from actual dairy molecules (Perfect Day)

2021 — Robotics and AI adopted in agriculture, packaging, and delivery

2022 — Cultivated meat gets regulatory approval

2023 — Companies develop AI-designed snacks, beverages, and alternative proteins.

2024 — Companies engineer animal-identical fats (eg; butter fats, egg fats).

2026 — **Ultra-Processed 2.0**
AI-generated flavors, computational nutrition modeling
synthetic emulsifiers designed at molecular level
appetite-responsive texture engineering

Mariami Rusishvili
Evolution of Disruptive Technologies, JKU