City of Giessen:
Population 78,000
32,000 students
Giessen
former House of Armament
Institute of Agriculture
Justus von Liebig
1803-1873

Professor at the age of 21 years!
Liebig-Museum in Giessen
Outline

Let there be light (Gen. 1.3)

- Introduction – glowing
- The past – dim
- The present – clear
- The future – bright
- Closing remarks – enlightened

„More light“
last words of
J.W. von Goethe, 1832
Outline
Let there be light (Gen. 1.3)

- Introduction – glowing
Was ist an apple?
Outline

*Let there be light* (Gen. 1.3)

- Introduction – glowing
- The past – dim . . . . a quick run
The ancient cultures predominantly plant based diets
(inspite/because of agriculture)

Some examples:

- Egypt ~ plants + fish
- China ~ TCM
- India ~ Ajurveda
- Peru: The Inkas ~ potatoes
- Mexico: The Mayas ~ maize (corn)
Antiquity (1200 BC – 600 AD)

- 776 first Olympic Games

- 6th century: The Orphics were the first documented vegetarians in Europe
  (The mythical figure of Orpheus was an exceptionally gifted singer)

- 490 battle of Marathon (Athens vs Persia) 42,195 m
Pythagoras of Samos, Greece

philosopher
570 – 500 BC

Founder of ethical vegetarianism
he drank only water

The Pythagorean lifestyle influenced civilisation until the 19th century
Platon
Greece

philosopher
428 – 348 BC

Politeia:
Town people should live vegetarian

Meat-eaters need a doctor
Ovid
Sulmo, Italy

Roman poet
47 BC-17 AD

Metamorphoses:

Strong arguments against eating meat
Plutarch
Greece
Poet
45 – 120 AD

Moralia:
preached
Love of animals
Reasons to be a vegetarian in antiquity

- Animals are related to man
- Animals can communicate and think
- Man is legally responsible for animals
- Killing animals means injustice and harm
- Animal protection trains in humanitarianism
Reasons to be a vegetarian in antiquity

- Animals are related to man
- Animals can communicate and think
- Man is legally responsible for animals
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- Animal protection trains in humanitarianism

- Reincarnation
Reasons to be a vegetarian in antiquity

- Animals are related to man
- Animals can communicate and think
- Man is legally responsible for animals
- Killing animals means injustice and harm
- Animal protection trains in humanitarianism

- Reincarnation

- Eating meat is harmful to health
- Eating meat influences the mind
- Plant food cleanses the soul
- Vegetarianism leads to an alignment with the gods
- There is enough to eat without meat
Major religions and vegetarianism

**Hinduism**: 2000 BC: *Veden*  
non-violence towards all living things

**Buddhism**: 6th century BC  
mercifulness and **vegetarian** lifestyle

**Judaism**: Tora / Talmud / Old Testament  
merciful treatment of animals

**Christianity**: New Testament  
Thou shalt not kill (5th commandment)
Middle Ages (6th – 15th century)

- Thomas of Aquin (Italy, 1225 - 1274).
Theologian and philosopher

He represents the thinking of the dark ages: Animals have no intellect, they can be used, alive or dead.
Vegetarianism in the Renaissance
(15th and 16th century)

universal genius
He was a committed vegetarian.

Quote: The time will come, when we will condemn the eating of animals, just as today we condemn the eating of our own kind, the consuming of humans.
Vegetarianism in the Age of Enlightenment
(17\textsuperscript{th} and 18\textsuperscript{th} century)

- **Voltaire** (France, 1694-1778)
  
  author and philisopher.

  proponent of a *vegetarian* lifestyle.

- **Jean-Jacques Rousseau**
  (France, 1712-1778)

  author, philosopher, naturalist and composer.

  praised the virtues of a *Pythagorean* lifestyle.
Vegetarianism in the 19th century: Europe

- Percy Basshe Shelly (poet, 1792-1822).
  Conviction:
  *Meat eating leads to all evils in the world.*
  *Meat production is a waste of resources!!*

  Book:
  *Plant food is the basis of a new world view.*
Vegetarianism in the 19th century: USA

- Sylvester Graham (priest, 1794-1851).

  Credo: Ascetic, Spartan lifestyle, vegetarian nutrition with plenty of raw food!!
  Graham bread: Whole meal wheat bread.

- John Harvey Kellogg (physician, 1853-1943).
  Battle Creek Sanatorium: Vegetarian food.
  Co-inventor of cornflakes, peanut butter et cet.

  Creed: No alcohol, no nicotin, no drugs, plenty of physical activity.
Vegetarianism in the 19th / 20th century

- George Bernard Shaw (philosopher, 1856-1950). Quote:
  Animals are my friends . . . and I don't eat my friends.

- Albert Einstein (physicist, 1875-1955). Quote:
  Nothing will increase the chances of survival for life on earth as much as the evolution to a vegetarian diet.
Vegetarianism in the 20th century: Europe

- Maximillian Oskar Bircher-Benner  
  (Swiss physician, 1867-1939)  
  Inventor of muesli (apples, nuts, lemon juice, cream)  
  **Credo:** Plant food contains surprising „sun“-power.

- Werner Kollath (German physician, 1892-1970)  
  Proponent of „plant based whole food“ (little processed)  
  **Creed:** Leave food as natural as possible.
Organised Vegetarianism

- 1809 first vegetarian club in Manchester, England
- 1847 Vegetarian Society (of the United Kingdom):
  Introduced the term vegetarian (before: “Pythagorean diet“)
- 1850 American Vegetarian Society (New York)
- 1867 German Vegetarian Society (Nordhausen)
- 1944 first Vegan Society (Leicester, England)
Outline
Let there be light (Gen. 1.3)

- Extra: The twilight zone . . .
  . . . between past and present
Nutrition: benefit and risk

1950s: unilateral approach (J. Sabaté)
Nutrition: risk and benefit

1960s: dual approach

Nutrition status

Risk of deficit | Optimal | Risk of excess

vegetarian diet | meat-based diet

Sabaté Am J Clin Nutr 2003
Nutrition: risk and benefit

1990s: dual approach

Nutrition status:
- Risk of deficit
- Optimal
- Risk of excess

vegetarian diet
meat-based diet

Sabaté Am J Clin Nutr 2003
Nutrition: risk and benefit

21st century: new approach

Nutrition status

Risk of deficiency | Optimal | Risk of excess

Vegetarian diet

Meat-based diet

Sabaté Am J Clin Nutr 2003
Cancer
REDUCE YOUR RISK

A VITAMIN A SOURCE
C VITAMIN C SOURCE
F FIBER SOURCE
* CRUCIFEROUS VEGETABLE

These good food choices may help protect you against certain cancers. For more information on lifestyle choices, contact:

AMERICAN CANCER SOCIETY

National Geographic 1983
The healing power of fruits and vegetables

Sensational medical discoveries

Eating against cancer
SHOULD YOU BE A VEGETARIAN?

Millions of Europeans are going meatless. Is that a healthy thing?
Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective

The Second WCRF / AICR Expert Report

2007 +
Evaluation of the WCRF panel for plant foods

Summary of ‘convincing’ and ‘probable’ judgements

Blue = probably reduced cancer risk

Red = convincing increased cancer risk
From the past to the present

The past is history,
the future is a mystery,
but today is a gift.
From the past to the present

The past is history,
the future is a mystery,
but today is a gift

. . . that is why it is called the present!
Outline

Let there be light (Gen. 1.3)

- Introduction – glowing
- The past – dim
- The present – clear
The present is . . .

. . . Loma Linda !

. . . The 6th ICVN !

. . . Vegetarianism !
The 6th ICVN
Research Categories

Vegetarian Nutrition and . . .

- Chronic Diseases
- Epidemiology
- Education
- Assessment
- Phytochemicals
The 6th ICVN
Research categories

Nutrition and . . . .

- Chronic Diseases
- Epidemiology
- **Education**
- Assessment
- Phytochemicals

- Life-cycle
- Policy
- Clinical settings
- Environment
- Climate change
- **Sustainability**
# Reasons for vegetarian nutrition

(= determinants of nutrient status)

<table>
<thead>
<tr>
<th>Intellectual reasons</th>
<th>Social reasons</th>
<th>Physical reasons</th>
</tr>
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<tbody>
<tr>
<td>ethical</td>
<td>ecological</td>
<td>health</td>
</tr>
<tr>
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<td>economical</td>
<td>hygiene</td>
</tr>
<tr>
<td>religious</td>
<td>political</td>
<td>toxicology</td>
</tr>
<tr>
<td>spiritual</td>
<td>fairness</td>
<td>performance</td>
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### Reasons for vegetarian nutrition

(= determinants of nutrient status)

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</tr>
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<td>- political</td>
<td>- toxicology</td>
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<tr>
<td>- spiritual</td>
<td>- fairness</td>
<td>- performance</td>
</tr>
</tbody>
</table>

Vegetarians and vegans (also) need nutrition education
Well-balanced vegetarian diet

A variety of . . . .

- Cereals, *unrefined*
- Legumes, incl. soya
- Potatoes, Irish and sweet
- Vegetables, all colors
- Fruits, all colors
Nutrient losses through processing  
(Whole meal flour compared to white flour)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Reduction, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary fiber</td>
<td>58</td>
</tr>
<tr>
<td>Folic acid</td>
<td>61</td>
</tr>
<tr>
<td>Iron</td>
<td>62</td>
</tr>
<tr>
<td>Vitamin B₁</td>
<td>78</td>
</tr>
<tr>
<td>Zinc</td>
<td>79</td>
</tr>
<tr>
<td>Lignan</td>
<td>81</td>
</tr>
<tr>
<td>Magnesium</td>
<td>90</td>
</tr>
<tr>
<td>Selenium</td>
<td>92</td>
</tr>
</tbody>
</table>
Well-balanced vegetarian diet

A variety of . . . .

- Cereals, unrefined
- Legumes, incl. soya
- Potatoes, Irish and sweet
- Vegetables, all colors
- Fruits, all colors
- Nuts, unsalted
- Seeds and seedlings
- Herbs and spices
- Mushrooms
- Raw food (Graham)
The value of raw food

- No destruction of nutrients
- Requires intensive chewing
- Stimulates salivation
- Cleans teeth
- Increases satiety
- Supports digestion
- Prevents over-eating
- Normalises transit time
Position of the ADA

It is the position of the American Dietetic Association that appropriately planned* vegetarian diets, including total vegetarian or vegan diets, are healthful, nutritionally adequate, and may provide health benefits in the prevention and treatment of certain diseases.

Well-planned* vegetarian diets are appropriate for individuals during all stages of the life cycle, including pregnancy, lactation, infancy, childhood, and adolescence, and for athletes.

Craig and Mangels: J Am Diet Assoc 109(7):1266-82, 2009
* supplements?
Supplements instead of whole food?
Potentially critical nutrients for meat-eaters

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Group at Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>iron</td>
<td>especially girls and young women</td>
</tr>
<tr>
<td>iodine</td>
<td>only 70% of recommendation is attained</td>
</tr>
<tr>
<td>zinc</td>
<td>especially children and senior citizen</td>
</tr>
<tr>
<td>calcium</td>
<td>especially the young and the old</td>
</tr>
<tr>
<td>vitamin D</td>
<td>depending on synthesis in the skin</td>
</tr>
<tr>
<td>folic acid</td>
<td>especially the vegetable grumps</td>
</tr>
<tr>
<td>n-3 fatty acids</td>
<td>only 50% of recommendation is attained</td>
</tr>
</tbody>
</table>

*common groups at risk (increased nutrient requirements):

children, pregnant and nursing women, elderly and the sick
Potentially critical nutrients for vegetarians / vegans

<table>
<thead>
<tr>
<th>Vegetarians</th>
<th>Vegans (in addition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- iron</td>
<td>- vitamin $B_{12}$</td>
</tr>
<tr>
<td>- iodine</td>
<td>- vitamin $B_2$</td>
</tr>
<tr>
<td>- zinc</td>
<td>- calcium*</td>
</tr>
<tr>
<td>- vitamin D</td>
<td>- protein</td>
</tr>
<tr>
<td>- n-3 fatty acids</td>
<td></td>
</tr>
</tbody>
</table>
# Recommendations for vitamin $\text{B}_{12}$ intake

adults 20-50 years of age

<table>
<thead>
<tr>
<th>Organisation/Country</th>
<th>ug $\text{B}_{12}$/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>3.0</td>
</tr>
<tr>
<td>USA</td>
<td>2.4</td>
</tr>
<tr>
<td>FAO / WHO</td>
<td>2.4</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.5</td>
</tr>
<tr>
<td>Victor Herbert*</td>
<td>0.5</td>
</tr>
</tbody>
</table>

* US Vitamin B$_{12}$ specialist (1927 - 2002)
### Recommendations for calcium intake

**adults 20-50 years of age**

<table>
<thead>
<tr>
<th>Organisation/Country</th>
<th>mg Ca/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAO / WHO</td>
<td>450</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>500</td>
</tr>
<tr>
<td>Japan</td>
<td>600</td>
</tr>
<tr>
<td>Canada</td>
<td>700</td>
</tr>
<tr>
<td>USA</td>
<td>800</td>
</tr>
<tr>
<td>Germany</td>
<td>1000</td>
</tr>
</tbody>
</table>
Risk for chronic diseases
(Adventist Health Study and others)

Compared to meat-eaters, vegetarians . . .

- are less overweight
- have a lower diabetes risk
- show lower blood pressure and less hypertension
- suffer less heart diseases
- have a lower cancer risk

A wholesome vegetarian nutrition . . .

- lowers the risk for other chronic diseases
- can increase life expectancy
Body weight / BMI
Adventist Health Study 2
(Tonstad et al. 2009)
Conclusion:
"The 5-unit BMI difference between vegans and nonvegetarians indicates a substantial potential of vegetarianism to protect against obesity."

Tonstad et al. 2009
## Diabetes type 2

Adventist Health Study 2

<table>
<thead>
<tr>
<th>Diet Type</th>
<th>Diabetes Prevalence (%)</th>
<th>Risk (Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegans</td>
<td>2.9</td>
<td>0.51</td>
</tr>
<tr>
<td>Lacto-ovo-Vegetarians</td>
<td>3.2</td>
<td>0.54</td>
</tr>
<tr>
<td>Fish eaters</td>
<td>4.8</td>
<td>0.70</td>
</tr>
<tr>
<td>Seldom fish eaters</td>
<td>6.1</td>
<td>0.76</td>
</tr>
<tr>
<td>Meat eaters</td>
<td>7.6</td>
<td>1</td>
</tr>
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---

### Estimated number of vegetarians in different countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Population Mio.</th>
<th>No. of Vegetarians Mio.</th>
<th>Quota of Vegetarians %</th>
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<td>1 260</td>
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<td>17</td>
<td>0.7</td>
<td>4</td>
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<td>USA</td>
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<td>1.3</td>
<td>4</td>
</tr>
<tr>
<td>Austria</td>
<td>8</td>
<td>0.25</td>
<td>3</td>
</tr>
<tr>
<td>Switzerland</td>
<td>8</td>
<td>0.23</td>
<td>3</td>
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Africa, Eastern Europe and South-America mostly below 1 %
Pyramids of Gizeh near Kairo
2500 BC in the 4th Dynastie
The Vegetarian Food Pyramid

Guidelines for Healthful Vegetarian Diets
- Variety of plant foods in abundance
- Emphasis on unrefined foods
- Healthy range of fat intake
- Adequate water and other fluids
- Regular physical activity
- Moderate sunlight exposure

LOMA LINDA UNIVERSITY
School of Public Health
Department of Nutrition

* A reliable source of vitamin B12 should be included if no dairy or eggs are consumed.

Other Lifestyle Recommendations
- Daily Exercise
- Water—eight 8 oz. glasses per day
- Sunlight—10 minutes a day to activate vitamin D
The Vegan Food Pyramid

Loma Linda Vegan Food Pyramid

Water
8-10 glasses a day. If you are active, drink more.
**Sonnenlicht**
(mind. 15 min pro Tag)
...für Vitamin D
(in den sonnenarmen Monaten kann die Vitamin-D-Versorgung durch entsprechend angereicherte Produkte oder Suplemente gesichert werden)

*Vitamin B₁₂*
Bei veganer Ernährung sollte die sichere Versorgung mit Vitamin B₁₂ durch entsprechend angereicherte Produkte (z.B. Sojamilch, Säfte, ...) und Suplemente abgesichert werden.

**Körperliche Aktivität**
(mind. 30 min pro Tag)

**Kalzium**
Bei veganer Ernährung sollten gezielt kalziumreiche pflanzliche Lebensmittel (z.B. dunkelgrünes Gemüse, Nüsse, Samen, ...) kalziumreiche Mineralwässer sowie mit Kalzium angereicherte Produkte verzehrt werden.
Therefore, the present is . . . .

- a gift
- a challenge
- an opportunity
- a responsibility

. . . . for the future
Outline

Let there be light (Gen. 1.3)

- Introduction – glowing
- The past – dim
- The present – clear
- The future – bright
The future requires a view beyond the horizon
The future for vegetarian nutrition is bright.

For ethical, moral, religious + spiritual reasons:

People no longer want animals to suffer and to be killed a miserable life just to please their taste buds.
Who needs this?

~60% of daily energy requirement

1420 Kcal
The future for vegetarian nutrition is **bright**.

For ecological, economical and political reasons:

People neither want the destruction of the basis of their lives nor a **climate change**.
The future for vegetarian nutrition is **bright**

For reasons of health, hygiene and performance:

People no longer want to suffer from preventible, nutrition-related **diseases**.
Obesity

The epidemic of the 21st century
The future for vegetarian nutrition is bright

For reasons of sustainability and peace:

People want a stable quality of life for themselves, for their children and for generations to come.
The future has many names

- For the weak it is the unattainable
- For the scared it is the unknown
- For the brave it is the **opportunity**.

Albert Einstein
Opportunity: *We are the consumers*

- *We* have to build the future
- Together we are strong
Opportunity: We are the consumers

- We have to build the future
- Together we are strong

- The consumer is king
- Only food that is bought will be produced
- Each food purchase is a ballot
Opportunity: We are the consumers

- **We** have to build the future
- Together we are strong

- The *consumer* is king
- Only food that is bought will be produced
- Each food purchase is a ballot

- Trickle-up effect does work in politics
- Independent nutrition *education* for everybody
Outline

*Let there be light* (Gen. 1.3)

- Introduction – glowing
- The past – dim
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- The future – bright
- Closing remarks – enlightened
Important quote of the last century

„Our biggest problem is the transformation of plant food into animal products“

„I will not exclude the possibility that by the end of the 21st century, all of mankind will live vegetarian“

Helmut Maucher, CEO Nestlé, July 19, 1996
All we need from now on is plant-based whole food
The lesson for today

*Much is known . . .
unfortunately in different heads.*

Werner Kollath, 1892-1970
Thank you for your attention