INTERNATIONAL SEMINARS ON PLANETARY EMERGENCIES
49th Session
THE ROLE OF SCIENCE IN THE THIRD MILLENNIUM
Erice 19 – 24 August 2016
UNDER THE HIGH PATRONAGE OF THE PRESIDENT OF THE REPUBLIC OF ITALY

OPENING LECTURE

SCIENCE FOR PEACE THE WORLD OVER
THE NEW MANHATTAN PROJECT

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Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy

Saturday, 20 August 2016
Paul A.M. Dirac Lecture Hall – Patrick M.S. Blackett Institute
1
INTRODUCTION
ABOUT WHERE
WE COME FROM
I would like to recommend all of you to read the special volume published (Figure 1) by the University of Bologna (the 1st in the world established more than 900 years ago) on the 3 Days devoted to let people know • Science • Technology • Culture with 60 events and 30,000 participants.
The fathers of the New Manhattan Project

Wigner
Fermi
Dirac
Kapitza
Teller
Oppenheimer

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At the centre of the Bologna events we have the logic of the “NEW MANHATTAN PROJECT” which should be called “SCIENCE FOR PEACE THE WORLD OVER”
My first point refers to Where We Come From: The basis for our “credibility”.
Please remember that the first name of our Seminar was not “Planetary Emergencies” but “Nuclear War”.

In Figure 2 there is the statement by Dirac on the 2\textsuperscript{nd} Session of our Seminars.

Now we are at Session 49\textsuperscript{th}.

«Put together Teller and Velikhov was a fact that none of us had ever believed».

Paul Dirac, 1982

Figure 2
Edward Teller (centre), scientific adviser of President Reagan, and Yevgeniy Velikhov (left), scientific adviser of President Gorbachev, together with A.Z. in Erice during the second International Seminar on Nuclear War on August 1982.

Figure 3
Our activity in Erice started with Dirac and Kapitza (Figures 4 and 5). This was the first time Kapitza could be outside the USSR to come to Italy.
First row: Paul Dirac and Pyotr Kapitza.
Second row: Eugene Wigner, John Eccles and R. Garwin
Third row: Georges Charpak


Figure 4
If Kapitza had not refused to be the n. 1 of the USSR H-bomb project the world would have had a millennium of Stalinistic Empire (Erice, 1982).

Figure 5
Kapitza, “pupil” with Dirac of Rutherford (the Nuclear Physics’ Father) was sequestered at the end of the thirties of the past century in the USSR when he went to visit his family.

Kapitza’s definition of John Paul II:

«The light of the world turned on to hunt the tragic darkness of Nazism and Stalinism». 
What about the roots which allowed Kapitza to leave USSR for the 1st TIME IN HIS LIFE?
These are our roots which allowed Kapitza to be in Erice for the 2nd Session of the Nuclear War Seminar.
During a Special Session of our International School in History the Figure 7 was elaborated in order to put on logical correspondence the two extreme values of Complexity:

1 – History, the example of highest level of Complexity;
2 – Science, the example of lowest level of Complexity.
The experimental evidence is that UEEC events dominate our life, **HISTORY** and **SCIENCE**.

The evolution of the world in its real life is History:

(EWRL $\equiv$ History)

and the evolution of our basic understanding of the laws governing the world is Science:

(EBUS $\equiv$ Science).
Let me call your attention on the number ten: X.

If Kapitza accepted to be the leader of the USSR H-bomb Project, as wanted by Stalin, we would not be here today.
<table>
<thead>
<tr>
<th>In History = EWRL</th>
<th>In Science = EBUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I</strong> What if Julius Caesar had been assassinated many years before?</td>
<td><strong>I</strong> What if Galileo Galilei had not discovered that $F = mg$?</td>
</tr>
<tr>
<td><strong>II</strong> What if Charles VII had not been able to win the 100 years war?</td>
<td><strong>II</strong> What if Newton had not discovered that $F = \frac{G m_1 m_2}{R^2}$?</td>
</tr>
<tr>
<td><strong>III</strong> What if America had been discovered a few centuries later?</td>
<td><strong>III</strong> What if Maxwell had not discovered the unification of electricity, magnetism and optical phenomena, which allowed him to conclude that light is a vibration of the EM field?</td>
</tr>
<tr>
<td><strong>IV</strong> What if Napoleon had not been born?</td>
<td><strong>IV</strong> What if Becquerel had not discovered radioactivity?</td>
</tr>
<tr>
<td><strong>V</strong> What if Louis XVI had been able to win against the ‘Storming of the Bastille’?</td>
<td><strong>V</strong> What if Planck had not discovered that $h \neq 0$?</td>
</tr>
<tr>
<td><strong>VI</strong> What if the 1908 Tunguska Comet had fallen somewhere in Europe instead of Tunguska in Siberia?</td>
<td><strong>VI</strong> What if Lorentz had not discovered that space and time cannot both be real?</td>
</tr>
<tr>
<td><strong>VII</strong> What if the killer of the Austrian Archduke Franz Ferdinand had been arrested the day before the Sarajevo event?</td>
<td><strong>VII</strong> What if Einstein had not discovered the existence of time-like and space-like real worlds? Only in the time-like world, simultaneity does not change, with changing observer.</td>
</tr>
<tr>
<td><strong>VIII</strong> What if Lenin had been killed during his travelling through Germany?</td>
<td><strong>VIII</strong> What if Rutherford had not discovered the nucleus?</td>
</tr>
<tr>
<td><strong>IX</strong> What if Hitler had not been appointed Chancellor by the President of the Republic of Weimar Paul von Hindenburg?</td>
<td><strong>IX</strong> What if Hess had not discovered cosmic rays?</td>
</tr>
<tr>
<td><strong>X</strong> What if Pyotr Kapitza accepted to be the leader of the USSR H-bomb Project as wanted by Stalin?</td>
<td><strong>X</strong> What if Dirac had not discovered his equation, which opens new horizons, including the existence of the antiworld?</td>
</tr>
<tr>
<td><strong>XI</strong> What if Nazi Germany had defeated the Soviet Union?</td>
<td><strong>XI</strong> What if Fermi had not discovered weak forces?</td>
</tr>
<tr>
<td><strong>XII</strong> What if Karol Wojtyla had not been elected Pope, thus becoming John Paul II?</td>
<td><strong>XII</strong> What if Fermi and Dirac had not discovered the Fermi–Dirac statistics?</td>
</tr>
<tr>
<td><strong>XIII</strong> What if Gorbachev had not been defeated by Yeltsin?</td>
<td><strong>XIII</strong> What if Yukawa had not proposed the existence of a “meson” in order to have the nuclear glue?</td>
</tr>
<tr>
<td><strong>XIV</strong> What if the USSR had not collapsed?</td>
<td><strong>XIV</strong> What if the ‘strange particles’ had not been discovered in the Blackett Lab?</td>
</tr>
</tbody>
</table>
What if Pyotr Kapitza accepted to be the leader of the USSR H-bomb Project as wanted by Stalin?
Where We Come From
Edward Teller → Erice | August 1982
SDI
The problem of the New Defense System

Ronald Reagan → 23 March 1983
SDI

Reagan and Gorbachev → 1985 → in Geneva
“The Erice Statement” for a
“Science without Secrets and without Frontiers”

Now: The New Manhattan Project, whose effective name should be “Science for Peace the World Over”
THE ERICE STATEMENT

- It is unprecedented in human history that mankind has accumulated such a military power to destroy, at once, all centres of civilization in the world and to affect some vital properties of the planet.

The danger of a nuclear holocaust is not the unavoidable consequence of the great development of pure Science.

In fact, Science is the study of the Fundamental Laws of Nature.

Technology is the study of how the power of mankind can be increased.

Technology can be for peace and for war. The choice between peace and war is not a scientific choice. It is a cultural one: the culture of love produces peaceful technology. The culture of hatred produces instruments of war.

Love and hatred have existed forever. In the bronze and iron ages, notoriously pre-scientific, mankind invented and built tools for peace and instruments of war. In the so-called "modern era" it is imperative that culture of love wins.

An enormous number of scientists share their time between pure Science research and military applications. This is a fundamental source for the arms race.

It is necessary that a new trend develops, inside the scientific community and on an international basis.

- Here are our proposals:

1. Scientists who wish to devote all of their time, fully, to study theoretically or experimentally the basic laws of Nature, should in no case suffer for this free choice, to do only pure Science.

2. All Governments should make every effort to reduce or eliminate restrictions on the free flow of information, ideas and people. Such restrictions add to suspicion and animosity in the world.

3. All Governments should make every effort to reduce secrecy in the technology of defense. The practice of secrecy generates hatred and distrust. To start a ban for military secrecy will create greater stability than offered by deterrence alone.

4. All Governments should continue their action to prevent the acquisition of nuclear weapons by additional nations or non-national groups.

5. All Governments should make every effort to reduce their nuclear weapons stockpiles.

6. All Governments should make every effort to reduce the causes of insecurity of non-nuclear powers.

7. All Governments should make every effort to ban all types of nuclear tests in war technology.

- Conclusion

Those scientists — in the East and in the West — who agree with this «Erice Statement», engaging themselves morally to do everything possible in order to make the new trend, outlined in the present document, become effective all the world over and as soon as possible.

- This Statement was written in ERICE, August 1982, by Paul A.M. DIRAC, Piotr KAPITZA and Antonino ZICCHI. By now the number of signatories of the Erice Statement has exceeded 100,000, the world over.

- The ‘Erice Statement’ has attracted, in the eighties, the attention of World Leaders such as Deng Xiaoping (China), Mikhail Gorbachev (USSR), Olof Palme (Sweden), Sandro Pertini (Italy), Ronald Reagan (USA), Pierre Trudeau (Canada) and stimulated various actions on their part for a Science without secrecy and without frontiers.
2
THE PRESENT SCIENTIFIC STRUCTURE OF OUR PROJECT
SCIENCE AND CULTURE NEEDED IN THE III MILLENNIUM
CLIMATE
THE SCIENCE OF COMPLEX NETWORKS
NUCLEAR ENERGY AND SAFETY
THE FUTURE OF CYBER SECURITY
STUDIES IN CONFLICTS AND TERRORISM
ORGANIZING PLANETARY DEFENCE AGAINST COSMIC OBJECTS
CHILDREN WELFARE
HUMAN WELFARE IN AN ELDERLY SOCIETY
HUMAN AND SOCIAL MEDICINE
HEALTH AND ENVIRONMENT
RESEARCH ON NEURODEGENERATION AND DEMENTIA
SUSTAINABILITY
SCIENTIFIC RESEARCH AND DEVELOPMENT OF LIFE
WATER CRISIS
The present Scientific Structure of our Project is strongly connected with the Whole of our Knowledge.
We scientists cannot remain silent when the great public shows a vivid interest for topics such as:

- Global warming
- The energy crisis
- The information security
- The environment
- The Intelligent Design
- The Evolution
- and other Problems coming from the “Whole of our Knowledge”.
The mathematics is at least a system of three non-linear differential equations, coupled. Such a system has no analytic solution, only mathematical models with free parameters. Each model needs experimental verification.
We have to convince the great public that the solution to all these problems requires clarity and rigour and that the best way to study these problems is through Science.

Since Physics is the “Queen of all Sciences”, (Enrico Fermi), the solution of these problems needs physicists and scientists of all other fields.
WHY SCIENCE

There are many intellectual activities which people consider to be Science. But there is a general agreement about Physics being the mother and the queen of all Sciences.

We should not forget that Modern Science, thanks to Galileo Galilei, is based on the following fundamental point: no matter what we are thinking (including the very rigorous theoretical form of thinking, which means expressing all our ideas using mathematical language, i.e. formulae), we have to find out what experiment has to be realized in order to prove the validity of our intellectual activity. If this is not the case, our intellectual activity has nothing to do with Science.

Richard Feynman (Erice, 1964): “It doesn’t matter how beautiful your theory is, it doesn’t matter how smart you are. If it doesn’t agree with experiment, it’s wrong.”
But the present trend is to study the topics mentioned above through the “new Science”, the so called “Science of Complexity”.
In fact the “Modern Culture” considers “Complexity” a source of new insights in physics, biology, geology, cosmology, social sciences and in all intellectual activities which look at the world through the lens of a standard analysis in terms of either

“Platonic Simplicity”
or “Complexity”.
This problem is not new. Let me quote an example dated on the year 2000 when in Vienna at the International Institute Erwin Schrödinger the problem of new Projects for new Physics was discussed and deeply analysed.
“QUANTUM [UN]SPEAKABLES”
Commemoration of John S. Bell
Universität Wien, 10-14 November 2000

JOHN BELL
AND THE TEN CHALLENGES
OF SUBNUCLEAR PHYSICS

ANTONINO ZICHICHI
INFN and University of Bologna, Italy
CERN, Geneva, Switzerland

John Stewart Bell in Erice

«There is no new Physics without new projects»

International Erwin Schrödinger Institut (ESI)
Wien – Friday, 10 November 2000
John Bell is the father of Bell’s Inequalities which is the only rigorous answer to the famous Einstein-Podolsky-Rosen paradox (EPR paradox).
The Motor for Progress is Scientific Discovery
Are the scientific discoveries which generate Technological Inventions. Example

1897 – e⁻ – J.J. Thomson

We live in the Era of Electronics Technology.
If Science would stop making Discoveries our future generations would have exactly our Technology.
Recall the Human History from 50,000 years up to 1600 DC. All Technologies were based on FIRE and WHEEL.
But nobody was studying the origin of Fire (Mass$\rightarrow$Energy) and of Wheel (zero friction). The only exception was Archimedes who was studying existing technologies.
Archimedes is the author of the first Gedankenexperiment in the History of Mankind.
In the last 400 years we have followed Galilei’s resurrection of Archimedes after 50,000 years of ignorance.
The resurrection of Archimedes started with Galileo Galilei 1800 years later.
Four centuries of Galilean research work based on Reductionism, i.e. on the identification of the simplest elements in the study of Nature, has allowed us to get the greatest achievements of Science, i.e. the so-called Standard Model and its extension (SM&B).

Our Technology is coming from the Scientific Discoveries for the SM&B.
**SM&B**

**THE STANDARD MODEL AND BEYOND**

1. **RGEs** \((\alpha_i (i = 1, 2, 3); \ m_j (j = q, l, G, H)) \& f (k^2).**
   - **GUT** \((\alpha_{GUT} = 1/24)\) & **GAP** \((10^{16} - 10^{18})\) GeV.
   - **SUSY** (to stabilize \(m_F/m_P \approx 10^{-17}\)).
   - **RQST** (to quantize Gravity).

2. **Gauge Principle** (hidden and expanded dimensions).
   - How a Fundamental Force is generated: SU(3); SU(2); U(1) and Gravity.

3. **The Physics of Imaginary Masses**: SSB.
   - The Imaginary Mass in SU(2)×U(1) produces masses \((m_W; m_Z'; m_q; m_l), \) including \(m_l = 0.\)
   - The Imaginary Mass in SU(5)⇒SU(3)×SU(2)×U(1) or in any higher (not containing U(1)) Symmetry Group ⇒ SU(3)×SU(2)×U(1) produces Monopoles.
   - The Imaginary Mass in SU(3)c generates Confinement.

4. **Flavour Mixings & CP ≠ , T ≠ .**
   - No need for it but it is there.

5. **Anomalies & Instantons.**
   - Basic Features of all Non-Abelian Forces.

---

**Note:**
- \(q\) = quark and squark;
- \(l\) = lepton and sleptron;
- \(G\) = Gauge boson and Gaugino;
- \(H\) = Higgs and Higgs;
- **RGEs** = Renormalization Group Equations;
- **GUT** = Grand Unified Theory;
- **SUSY** = Supersymmetry;
- **RQST** = Relativistic Quantum String Theory;
- **SSB** = Spontaneous Symmetry Breaking.

---

The five basic steps in our understanding of nature. ① The renormalization group equations (RGEs) imply that the gauge couplings \((\alpha_i)\) and the masses \((m_j)\) all run with \(k^2.\) It is this running which allows GUT, suggests SUSY and produces the need for a non point-like description (RQST) of physics processes, thus opening the way to quantize gravity. ② All forces originate in the same way: the gauge principle. ③ Imaginary masses play a central role in describing nature. ④ The mass-eigenstates are mixed when the Fermi forces come in. ⑤ The Abelian force QED has lost its role of being the guide for all fundamental forces. The non-Abelian gauge forces dominate and have features which are not present in QED.
The SM&B comes from the series of Experimental Discoveries which came from the discovery of

- “Virtual Physics”
- the “Nuclear Glue”
- and the totally unexpected
- “V-Particles”.
Virtual Physics

But Vacuum Polarization Effects had been discovered

Virtual Physics

Recall
Victor F. Weisskopf
($\approx -27$ MHz)

(Blackett) 1932

Radiative Effects

Scale Breaking in (DIS) $\leftarrow$ (Scaling) $\rightarrow$ (No Quarks)
All Quantities run with $q^2$:
Gauge Couplings [$\alpha_1(q^2)$, $\alpha_2(q^2)$, $\alpha_3(q^2)$] & Masses [the EGM effect]

Gauge Unification
GAP
and the EGM effect

Figure 9

Note: MHZ $= \frac{Mc}{sec}$. 
- 1947 -

**Nuclear Glue**

\( \pi - \text{Meson} \) \( (1^{\text{st}} \text{ Family}) \text{ quarks} \)

(Lattes, Muirhead, Occhialini, Powell)

\[ \pi \rightarrow \mu \rightarrow e \]

\[ \pi^0 \rightarrow \gamma \gamma \]

---

**Nuclear Forces**

\( R \approx 1 \text{ Fermi} \)

*Why* \( m_\pi \) *so small?*

*(\( \eta - \eta' \)) QCD (?)*

---

\[ \mu \text{ (2}\text{nd Family) lepton} \]

\[ (g - 2)_\mu = \text{QED} \]

\[ \tau_\mu = \text{G (Fermi)} \]

**HL = 3\text{rd Family}**

[later called \( \tau \)]

\[ \Gamma(X^0 \rightarrow \gamma \gamma) \rightarrow \text{too small} \]

\[ \Gamma(X^0 \rightarrow \text{all}) \rightarrow \text{too high} \]

\[ m(X^0) \rightarrow \text{too high} \]

---

**Instantons**

**\( \eta' \)-Leading in gluon Jets**

---

Figure 10
- 1947 -

V–Particles

Baryons and Heavy Mesons

(Blackett, Rochester, Butler)

Strange Particles

\[
\begin{align*}
P \neq & \neq C \\
\text{(\(\theta - \tau\) puzzle)} \leftarrow & \neq \\
\text{Flavour Mixing does not imply} & \text{CP} \\
\text{LOY} & \\
\text{CP} \neq & \\
\text{CP} \neq & \neq T \\
? & \\
\text{SU}(3)_f & \\
\text{Effective Energy} & \\
\text{Universality Features} & \\
\text{SU}(3)_c \equiv & \text{QCD} \\
\text{Asymptotic freedom – Confinement} & \\
\end{align*}
\]

Figure 11
The latest news from Science are E_{Planck} \& Complexity at the Fundamental Level illustrated in the next Figure.
FROM PLANCK TO COMPLEXITY

30 years ago $E_{\text{Planck}}$ & Now Complexity at the fundamental level

Figure 12
3
THE WHOLE OF OUR KNOWLEDGE
THE SUPERWORD

(9 + 1 + 1) = 11 = B; 32 = F

Space
Coupling

Time

Bosonic
Dimensions

Fermionic
Dimensions

43 = Dim

Total numbers of Dimensions

THE THREE FUNDAMENTAL FORCES

F_{EW}
Electroweak:
The force acting
between quarks & leptons

F_{QCD}
Quantum ChromoDynamics:
The force acting
between quarks & gluons

F_{G}
The
Gravitational
Force

THREE GAUGE CHARGES, Q_{G}, FOR THE THREE FUNDAMENTAL FORCES

THREE COLUMNS OF LEPTONS AND QUARKS
WITH TWELVE FLAVOUR CHARSES Q_{f}

ν_{e} ; ν_{µ} ; ν_{τ}

ν_{HL}

u ; c ; t

d ; s ; b

THIRTEEN Q_{f} FOR THE THREE COLUMNS

s ; t ; m ; E ; Ω ; Q_{G} “Subnuclear Colour” Charges ; Q_{f} “Subnuclear Flavour” Charges

↑↑↑↑↑
Space Time Mass Energy Spin

↑↑↑↑
(generating the Fundamental Forces) (responsible for the stability of Matter).

SEVEN BASIC QUANTITIES

c ≠ ∞ ; h ≠ 0

Figure 13A
From the Whole of our Knowledge it is born the Project: Science for Peace the World Over
4
THE LOGIC OF
“SCIENCE FOR PEACE THE WORLD OVER”. THE NEW MANHATTAN PROJECT
A PROJECT FOR MANKIND
SCIENCE FOR PEACE THE WORLD OVER: THE NEW MANHATTAN PROJECT

THE LOGICAL STRUCTURE OF THE PROJECT

① CERN APPROACH
② LAA (NEW TECHNOLOGIES FOR SPACE, TIME, ENERGY AND MASS)
③ ELN (300 Km; 10^6 GeV = 10^3 TeV = 1 PeV)
④ THE INTERNATIONAL AND NATIONAL SCHOLARSHIP
⑤ EEE (EXTREME ENERGY EVENTS — SCIENCE IN SCHOOLS)
⑥ PLANETARY EMERGENCIES (PILOT-PROJECTS)
⑦ MEDICAL PHYSICS
⑧ COMPLEXITY AT THE FUNDAMENTAL LEVEL

Housing for the Poor
Solidarity
Fight Usury
Reduce the number of Laws and increase clarity in the formulation
Elect an ad hoc Commission
Direct Democracy
Modern Technology is creating a challenge to the motivations for democratic representation: impossible for all to be in the same place

Which mathematical system better corresponds to the needs of democracy

Figure 14
5

STATUS OF
“SCIENCE FOR PEACE
THE WORLD OVER”
THE NEW MANHATTAN PROJECT
SUMMARY OF PROJECTS
<table>
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<th>ONGOING PROJECT–1</th>
<th>Managing Large Projects that Depend on New Technology: The CERN Approach</th>
</tr>
</thead>
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<tr>
<td>ONGOING PROJECT–2</td>
<td>The LAA Project</td>
</tr>
<tr>
<td>ONGOING PROJECT–3</td>
<td>The ELOISATRON Project</td>
</tr>
<tr>
<td>ONGOING PROJECT–4</td>
<td>The International and National Scholarships Project</td>
</tr>
<tr>
<td>ONGOING PROJECT–5</td>
<td>Extreme Energy Events</td>
</tr>
<tr>
<td>ONGOING PROJECT–6</td>
<td>The Polish Scientific Strategy on Climate</td>
</tr>
<tr>
<td>ONGOING PROJECT–7</td>
<td>Precise Timing for Medical Physics</td>
</tr>
<tr>
<td>ONGOING PROJECT–8</td>
<td>Complexity at the Fundamental Level</td>
</tr>
</tbody>
</table>
PROJECTS
ready to start

PROJECT–9  Control Planetary Emergencies Using the Science of Complex Networks
PROJECT–10 Nuclear Safety Centre: A Priority for the New Manhattan Project
PROJECT–11 Novel Technology for Nuclear Safeguards, Security and Nonproliferation
PROJECT–12 Development, Analysis and Evaluation of Cyber Resilience Strategies
PROJECT–13 Countering Terrorism Threats in Smart Cities: A concept Demonstration Using Unmanned Aircraft System (UAS) to Protect Critical Infrastructure
| PROJECT–14 | Organizing Earth Defense: An International Conference to make First Operative Steps |
| PROJECT–15 | Epidemiological and Laboratory Findings on Metabolic and Neurobehavioral Disorders due to Fetal and Infant Exposure to Hormonal Disruptors: Hypotheses Generation and Evaluation |
| PROJECT–16 | Global Emergency of Premature and Low Birth Weight Infant Mortality: KMC Strategy as a Solution? |
| PROJECT–17 | Biomonitoring: Exposure to Chemicals and Cancer Development. Investigations in “Terra dei Fuochi” |
| PROJECT–18 | Research on Oncogenic and Emerging/re-Emerging Infectious Diseases |
| PROJECT–19 | Neurodegeneration and Dementia: The Research Centre in The New Manhattan Project |
| PROJECT–20 | Circular Economy Patterns and the Bio-economy: General Principles and Specific Applications in Organic Waste Treatment |
| PROJECT–21 | Risk Evaluation for Agricultural Chemicals of Emerging Concern on food Safety and Human Health |
| PROJECT–22 | The Great Green Wall |
| PROJECT–23 | World Water Crisis Centre Proposal: The GRACE Satellite |
PRELIMINARY PROJECTS

PRELIMINARY PROJECT–24  What Science could do in Climate

PRELIMINARY PROJECT–25  The Cyber World in 2030

PRELIMINARY PROJECT–26  The Normative Challenges of Cyber Security: Prerequisites of a Universal Secure Cyber Space

PRELIMINARY PROJECT–27  Young People's Radicalization and Terrorism

PRELIMINARY PROJECT–28  The Institution of an Advanced School for Human and Social Medicine
PRELIMINARY PROJECT–29  The Welfare in an Aging Society
PRELIMINARY PROJECT–30  Linking Knowledge to Action: Building a Support Network for Safe Drinking Water and Sanitation
PRELIMINARY PROJECT–31  Interdisciplinary Research Centre of Excellence for Children Welfare
PRELIMINARY PROJECT–32  Sustainability and Scientific Culture: A Challenge for the Future
OVERVIEW OF THE 72 PLANETARY EMERGENCIES GROUPED INTO 15 CLASSES
THE 15 SOURCES OF THE 72 PLANETARY EMERGENCIES

Figure 15
OVERVIEW OF THE 72 PLANETARY EMERGENCIES GROUPED INTO 15 CLASSES

PLANETARY EMERGENCIES

I WATER

II SOIL

III FOOD

IV ENERGY

V POLLUTION

VI LIMITS OF DEVELOPMENT

VII CLIMATIC CHANGES

VIII GLOBAL MONITORING OF THE PLANET

IX NEW MILITARY THREATS IN THE MULTIPOLAR WORLD

X SCIENCE AND TECHNOLOGY FOR DEVELOPING COUNTRIES TO AVOID A NORTH-SOUTH ENVIRONMENTAL HOLOCAUST

XI THE PROBLEM OF ORGAN SUBSTITUTION

XII INFECTIOUS DISEASES

XIII CULTURAL POLLUTION

XIV COMMON DEFENSE AGAINST COSMIC OBJECTS

XV THE HUGE MILITARY INVESTMENTS

Figure 16
<table>
<thead>
<tr>
<th>THE 72 PLANETARY EMERGENCIES</th>
<th>NUMBER OF SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td>4</td>
</tr>
<tr>
<td>SOIL</td>
<td>3</td>
</tr>
<tr>
<td>FOOD</td>
<td>5</td>
</tr>
<tr>
<td>ENERGY</td>
<td>5</td>
</tr>
<tr>
<td>POLLUTION</td>
<td>7</td>
</tr>
<tr>
<td>LIMITS OF DEVELOPMENT</td>
<td>4</td>
</tr>
<tr>
<td>CLIMATIC CHANGES</td>
<td>5</td>
</tr>
<tr>
<td>GLOBAL MONITORING OF THE PLANET</td>
<td>6</td>
</tr>
<tr>
<td>NEW MILITARY THREATS IN THE MULTIPOLAR WORLD</td>
<td>3</td>
</tr>
<tr>
<td>SCIENCE AND TECHNOLOGY FOR DEVELOPING COUNTRIES TO AVOID A NORTH-SOUTH ENVIRONMENTAL HOLOCAUST</td>
<td>3</td>
</tr>
<tr>
<td>THE PROBLEM OF ORGAN SUBSTITUTION</td>
<td>5</td>
</tr>
<tr>
<td>MEDICINE, INFECTIOUS AND OTHER DISEASES</td>
<td>7</td>
</tr>
<tr>
<td>CULTURAL POLLUTION</td>
<td>8</td>
</tr>
<tr>
<td>INFORMATION SECURITY AND COMMON DEFENSE AGAINST COSMIC OBJECTS</td>
<td>2</td>
</tr>
<tr>
<td>THE HUGE MILITARY INVESTMENTS</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>
I  Total: 4

WATER

① PROTECTION OF NATURAL RESOURCES

② SEARCH FOR NEW SOURCES

③ DESALINIZATION

④ SAVINGS

PLANETARY EMERGENCIES
III Total: 5

FOOD

- PRODUCTION
- CLASSICAL AGRICULTURE
- MARINE AGRICULTURE
- PROCESSING
- STORAGE
- NEEDS & WASTE

PLANETARY EMERGENCIES
IV  Total: 5

ENERGY

PRODUCTION

CHEMICAL

NUCLEAR

FUSION (Future)

FISSION
(Now) Waste Transformation Accelerator Driven Reactors (I.S.)*

*I.S. = Intrinsically Safe

INCREASED EFFICIENCY & SAVINGS

DISTRIBUTION

RENEWABLE

PLANETARY EMERGENCIES
LIMITS OF DEVELOPMENT

1. DEMOGRAPHIC GROWTH

2. THE MEGA METROPOLISES AND THE COLLAPSE OF ALL VALUES

3. WATER, SOIL, FOOD, ENERGY

4. UNEMPLOYMENT

VI Total: 4
CLIMATIC CHANGES

THE 1ST LEVEL SCIENTIFIC PROBLEMS

1. THE MATHEMATICS NEEDED TO SIMULATE THE METEOROLOGICAL MOTOR

2. THE EXPERIMENTAL DATA NEEDED IN ORDER TO CHECK THE VALIDITY OF THE PREDICTIONS

THE 2ND LEVEL SCIENTIFIC PROBLEMS (GLOBAL EFFECTS)

3. THE PROBLEM OF UNDERSTANDING THE ORIGIN OF CLOUDS

4. THE EFFECTIVE CONSEQUENCES OF COSMIC RAYS

5. THE PROBLEMS OF NOW-CASTING, MEDIUM-RANGE AND GALACTIC-RANGE

PLANETARY EMERGENCIES
GLOBAL MONITORING OF THE PLANET

1. POLLUTION MONITORING
2. ATMOSPHERIC MONITORING
3. DEFENCE AGAINST FLOODS AND OTHER UNEXPECTED EXTREME EVENTS
4. EARTHQUAKES
5. VOLCANOES & CALDERA
6. DEFENCE AGAINST COSMIC OBJECTS
NEW MILITARY THREATS IN THE MULTIPOLAR WORLD

1. GLOBAL DEFENCE SYSTEM
2. DANGER OF PROLIFERATION OF WMD*
3. TERRORISM

*WMD = Weapons of Mass Destruction

PLANETARY EMERGENCIES
SCIENCE AND TECHNOLOGY FOR DEVELOPING COUNTRIES TO AVOID A NORTH-SOUTH ENVIRONMENTAL HOLOCAUST

THE NATIONAL SCHOLARSHIP PROJECT

SCIENCE WITHOUT SECRETS AND THE PROBLEM OF TECHNOLOGICAL DEVELOPMENTS PRO AND AGAINST MANKIND

THE ROLE OF BIG SCIENTIFIC RESEARCH CENTERS USING INERT MATTER AND LIVING MATTER

PLANETARY EMERGENCIES
THE PROBLEM OF ORGAN SUBSTITUTION

1. ARTIFICIAL ORGANS
2. NATURAL ORGANS
3. THE UNDERSTANDING OF "MINIMAL LIFE"
4. FROM INERT TO LIVING MATTER
5. THE CONTRIBUTION COMING FROM GENETIC ENGINEERING

PLANETARY EMERGENCIES
MEDICINE, INFECTIOUS AND OTHER DISEASES

1. AIDS
2. OTHER PATHOLOGIES (Ebola*)
3. INFECTIONS DUE TO STANDARD MEDICAL CARE
4. IN THE FIELD (Ebola*)
5. IN THE LABORATORY (Ebola*)
6. NEUROPATHOLOGICAL SOURCES
7. BIOTECHNOLOGICAL SOURCES

PLANETARY EMERGENCIES
CULTURAL POLLUTION

1. THE PROBLEM OF MODERN TECHNOLOGY & DEMOCRACY

2. RIGOROUS FOUNDATION OF DEMOCRACY: MATHEMATICS & DEMOCRACY

3. THE VALUES OF SCIENCE AND THE BASIC DISTINCTION BETWEEN SCIENCE & TECHNOLOGY

4. SCIENCE & FAITH

5. TV

6. RADIO

7. PRESS: SCIENCE & JOURNALISM

8. VIDEO & OTHER MEANS

PLANETARY EMERGENCIES
COMMON DEFENSE AGAINST COSMIC OBJECTS

1. DETECTION
2. DEFENSE

METEORITES AND COMETS

WITHOUT MEMORY THERE IS NEITHER SCIENCE NOR CIVILIZATION

<table>
<thead>
<tr>
<th>DINOSAUR EXTINCTION</th>
<th>ARIZONA</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 MILLION YEARS AGO (10^9 MT)</td>
<td>15MT (Fe) - 50,000 YEARS AGO</td>
</tr>
</tbody>
</table>

| | SIBERIA |
| | 10MT (H_2O) - 1908 |

PLANETARY EMERGENCIES
THE HUGE MILITARY INVESTMENTS

1. Dismantling of the 60,000 nuclear warheads
2. Destruction of chemical weapons
3. Reconversion of war industries
4. New initiatives to channel military resources towards projects for peace
5. The new arms race for high precision weapons

PLANETARY EMERGENCIES
7
ACTIVITY
AT PRESENT
The activity going on at present is in our Permanent Monitoring Panels: PMPs.
The PMPs are engaged in the study of the Problems presented in Chapter 2 which are connected with the following set:

• BIOTECHNOLOGY
• BRAIN AND BEHAVIOUR
• CLIMATOLOGY
• DEFENCE AGAINST COSMIC OBJECTS
• DESERTIFICATION
• ENERGY
• FLOODS AND EXTREME WEATHER EVENTS
• INFORMATION SECURITY
• LIMITS OF DEVELOPMENT
• MISSILE PROLIFERATION
• MOTHER & CHILD
• POLLUTION
• MOTIVATIONS FOR TERRORISM
• MITIGATION OF TERRORIST ACTS
• TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHY
• WATER.
The scope of each PMP is:

- Monitoring the scientific results of research conducted in the relevant fields.
- Organising scientific workshops to reconcile conflicting views on scientific issues and channel research efforts.
- Helping disseminate relevant scientific data and information.
- Organising yearly Group Meetings and reporting on group activities to the WFS Annual General Meeting in Erice.
- Writing recommendations for use by governments and international agencies.
At present each PMP
is working on a component of the
“Science for Peace the World Over
The New Manhattan Project”.

Once the “Science for Peace the Word Over”
will receive the financial support
from all Governments in the world,
each PMP will have the responsibility
for the detailed elaboration
and the implementation of the
Project specific to its competence.