

At Your Pace

Curso de Inglés con Fines Profesionales



4

Stretching Your Wings

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Stretching Your Wings

Part IV

Dra. C. Mérida Figueredo Reyes
Dra. C. Dolores Corona Camaraza



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Edición y corrección: Lic. María Eugenia de la Vega García
Lic. Benito A. Simancas Gelpi

Diseño de cubierta e interior: Olmer Buchholz Espinosa

Diagramación: Yohanka Morejón Rivero

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SECTION 1

Science and Technology



Con *Stretching Your Wings*, presentamos la cuarta y última parte del curso de inglés elaborado en Cuba con el título *At Your Pace*. Concebida también para la modalidad semipresencial, basada fundamentalmente en el autoestudio, esta cuarta parte está dirigida a contribuir a que los estudiantes universitarios puedan utilizar esta lengua extranjera como un instrumento de trabajo en actividades de corte profesional. Los materiales seleccionados y las actividades diseñadas ayudarán a poner en tensión todos los conocimientos adquiridos y las habilidades desarrolladas con el curso de inglés general y el curso de inglés para el contexto académico, y cumplirán la función de seguir ampliándolos.

Stretching Your Wings introduce selecciones de materiales auténticos (artículos científicos de revistas especializadas, capítulos de libros, informes de estudios de caso, informes de investigación, entrevistas, resúmenes, entre otros) con las cuales se persigue cumplir el objetivo de continuar perfeccionando el dominio del idioma inglés con formatos, temáticas y vocabulario de interés y utilidad para el profesional en formación o en ejercicio.

A partir de un texto oral o escrito se han diseñado actividades diversas para que posibiliten continuar desarrollando la comprensión auditiva, la expresión oral y escrita y la lectura. Se han incluido actividades que le permiten al estudiante “retarse” a sí mismo, al tener que valerse del inglés para extraer información que le posibilite después opinar, comparar, argumentar, refutar ideas, datos o criterios.

En atención a los formatos que se presentan y las temáticas que se abordan, los textos seleccionados han sido distribuidos en dos secciones: una, titulada “Science and Technology” y la otra, “Social Studies”. En aras de consolidar una formación cultural integral, pensamos que estudiantes de las diferentes carreras incursionarán con interés en ambas secciones.

Trabajar con *At Your Pace (Part IV) Stretching Your Wings*, es una oportunidad para nuestros estudiantes universitarios de seguir practicando el inglés y de constatar todo lo que ya son capaces de hacer con este idioma para su mejor desempeño profesional.

LAS AUTORAS

Biotechnology in Cuba (I)



Objectives: In this unit you will become acquainted with the layout and features of a **paper** published in a journal, particularly with its abstract, the introduction and two of the main ideas developed in the main body of the paper. Exercises have been built around excerpts of the paper **Biotechnology in Cuba: 20 Years of Scientific, Social and Economic Progress** to help you better understand the vocabulary and the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

Fill in the blanks to complete these definitions using words from the list.

1. What is biotechnology?

"Biotechnology means any _____ application that uses biological systems, living _____, or derivatives thereof, to make or _____ products or _____ for specific use." From The Convention on Biological Diversity (Article 2. Use of Terms) United Nations, 1992.

modify - technological- organisms - biology - processes

2. What is bioinformatics? What is computational biology?

Bioinformatics is a _____ field that refers to the creation and advancement of algorithms, computational and statistical _____, and theory to solve formal and practical _____ posed by or inspired from the management and _____ of biological data. Computational biology, _____, refers to hypothesis-driven investigation of a specific _____ problem using computers, carried out with experimental and simulated data, with the primary _____ of discovery and the advancement of biological knowledge.

**on the other hand - problems - techniques - analysis - biological - goal - data -
- biotechnology**

II. Begin Reading

Here's the first page of the paper you are going to work with. Notice the information it contains: title, authors and information about them, an abstract, the source, keywords and specific information to contact the main author.

1. Skim the page and identify common features to all researchers.

2. Read the abstract and identify the objective of the paper and its main ideas.

PAPERS

Biotechnology in Cuba: 20 Years of Scientific, Social and Economic Progress

ERNESTO LÓPEZ MOLA, RICARDO SILVA, BORIS ACEVEDO, JOSÉ A. BUXADÓ, ÁNGEL AGUILERA and LUIS HERRERA

Date Received (in revised form): 4th August, 2006

ERNESTO LÓPEZ MOLA

Founder and Director of Business and Project Development at the Centro de Ingeniería Genética y Biotecnología (CIGB). He was previously a researcher and Head of vaccine manufacture at the CIGB and sales manager at Heber Biotec S.A.

RICARDO SILVA

Founder of the Business Development Group (GNDP); he has been working in the sector for 15 years. Prior to joining the GNDP, he worked in the Vaccines Division of the CIGB.

BORIS ACEVEDO

Joined the GNDP in July 2001. Prior to joining GNDP, he was a researcher in the Immunotechnology Division at the CIGB; he has been working in the sector for more than 10 years.

JOSÉ A. BUXADÓ

Chemical engineer in the Direction of Manufacture at the CIGB. Previously, he worked at the GNDP for two years. He has been working in the sector for more than ten years.

ÁNGEL AGUILERA

Medical doctor working at the CIGB for 20 years.

LUIS HERRERA

General Director of the CIGB. He was the former director of research at the Center for Biological Research. He is a pioneer of the work on recombinant DNA in Cuba.

Abstract

An analysis of the biotechnology development in Cuba for 20 years has been attempted in this paper. This paper deals with the evolution of the biotechnology sector since the 1980s, how it was structured and its most important scientific and technical results. Relevant discoveries, methodologies, technologies, and products developed at the Center for Genetic Engineering and Biotechnology are also presented as significant contributions to the advances of the life sciences. Data and evidence are shown in this document that demonstrates the feasibility of developing a new industry in a developing country under foreign economic pressures. Conclusions suggest new paradigms, and future discussions of the broadest interest on the Cuban approach for developing the biotechnology industry.

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Keywords: Cuba, biotechnology, market, business, vaccines, therapeutics

Correspondence: Ernesto López Mola, Avenue 31, e / 158 y 190,
Cubanacán, Playa, PO Box 6162, La Habana 10 600, La Habana, Cuba
Tel: + 53 7 271 23 97
Fax: + 53 7 271 80 70
E-mail: ernesto.lopez@cigb.edu.cu

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III. Keep on Reading

A. Drawing info from the introduction

Scan through the **Introduction** and find:

1. Cuba's achievements in developing human resources in the 60s and 70s.
2. The beginnings of biotechnology industry in Cuba.
3. The factors that characterize the biotechnology industry in Cuba. Translate two of them into Spanish.
4. Reasons to expand collaboration to all sectors.

Introduction

In the 1980s, the gap between new knowledge and its subsequent application narrowed more than ever before in developed countries. Among major government concerns was the use of recombinant DNA, human gene therapy, foetal biology, biosafety, and also in founding and funding new institutes for developing new technologies. Impressive advances in molecular biology generated a set of promising applications in the fields of health, agriculture, energy, industry, and environmental protection. But the majority of developing countries had little if any access to these new technologies, which would have helped to solve their economic and social problems. But this situation did and does not exist in all developing nations. During the 1960s and 1970s, Cuba trained many scientists and engineers what resulted in about 1.8 researchers per 1 000 inhabitants, a figure well above the mean value of Latin America (0.4), and close to that of Europe (2.0). This situation placed Cuba well outside the trend of correlation between the size of a country's scientific system compared to that of its economy, and subsequently these favourable conditions permitted a new development programme to be established.

The first attempts for developing the biotechnology industry in Cuba started with the foundation of the Biological Front in July 1980, a professional

interdisciplinary forum working together with government authorities to explore potential applications of this emerging science. Outbreaks of meningitis, dengue fever, and conjunctivitis likely accelerated the decision-making process and Cuba subsequently established its first biotechnology institutions in the 80s. Some factors exclusively characterize the biotechnology sector in Cuba:

- I. the investor has been the Cuban government;
- II. biotechnology is part of the health system, and for this reason the national needs are the first priority;
- III. the research output is generated entirely by native rather migrant scientists and professionals;
- IV. operating capacity in a 'closed cycle': from research to commercialization by fully integrated institutions and profits from sales overseas;
- V. national collaboration instead of individual competition as the driving force;
- VI. spin-out companies derived from scientific and / or production institutions;
- VII. improvement in the ability to access foreign markets, particularly in the developed world, based on quality, production volumes, cost, novelty, and joint ventures.

The development of a new industry required coordination of research and development (R&D) between institutions and mutual access to new discoveries through fair collaborations as the challenges being faced could not be overcome in a competitive environment, as is usual in developed

countries, because resources are limited. The urgency for immediate application of scientific results reinforced the need for expanding collaboration across all sectors, from health to agriculture. The new paradigm was then how to structure integration and collaboration.

B. Drawing info from the main body of the paper

1. Before drawing information from section **THE CIGB'S PIPELINE** read these dictionary definitions of **pipeline**. Then, scan through the section and choose the definition that suits the context best.

Pipeline:

1. a line of pipe with pumps, valves, and control devices for conveying liquids, gases, or finely divided solids
2. a direct channel for information
3. a process or channel of supply: "an arms pipeline"
4. a state of development, preparation, or production: "several projects in the pipeline"; also: the system for such processes "a strong product pipeline"

2. Once you have chosen the most suitable definition in this context, choose the corresponding Spanish equivalent from the following list:

tubería - conducto - cartera (de proyectos)

3. Scan through the section again and complete the chart. Be ready to present it orally. (You may be asked to talk about this in the practice session with your classmates and language teacher.)

Products already developed and their uses	Products in different development stages
1. _____ Use: treatment of diabetic foot ulcers	therapeutic version of the anti-hepatitis-B vaccine
2. _____ Use: cervical intraepithelial neoplasia and carcinoma <i>in situ</i>	anti-dengue fever, anti-hepatitis C and anticancer vaccines.

3. <i>Haemophilus influenzae</i> type b vaccine	
4. Recombinant vaccine for hepatitis-B	
5. _____	
6. Human recombinant erythropoietin	
7. _____	
8. _____	
9. _____ Use: growth and survival of farmed fish	

The CIGB's Pipeline

The CIGB has become one of the most important research-production facilities at the “Western Havana Bio-Cluster” and conducts research in the fields of healthcare and agricultural and animal biotechnology. Research generated by the CIGB has developed a number of products, which are already having a significant impact on society.

One such product is CITOPROT-P® which was developed to treat diabetic foot ulcers, which are the most common cause of non-traumatic lower extremity amputations in the industrialised world, let alone in developing countries. This product was the result of more than ten years of research and two subsequent clinical trials performed in Cuba. (...)The novelty of CITOPROT-P® is in its application route. Rather than just applying it to the open wound it is injected into the healthy edges of the wound, thereby allowing the tissue to initiate the wound healing process before it is destroyed.

In January 2006, the CIGB started the first clinical trial to assess its safety and a dose scale-up study with the trial drug CIGB-300 was performed in patients with cervical intraepithelial neoplasia (...) and carcinoma *in situ* who had failed to respond to other available treatments.

Other CIGB products include a *Haemophilus influenzae* type b vaccine (the only synthetic vaccine of its kind in the world) which was designed and synthesised at the Laboratory of Synthetic Antigens at the University of Havana as well as a recombinant vaccine for hepatitis-B, thrombolytic recombinant streptokinase, and human recombinant erythropoietin, granulocyte colony-stimulating factor, and alpha and gamma interferons.

A therapeutic version of the anti-hepatitis-B vaccine is in advanced evaluation stages and other innovative products include antidengue fever, antihepatitis-C, and anticancer vaccines. In addition, the CIGB is negotiating technology transfer operations with other countries in exchange for its vaccines and drugs.

In non-human research, aquaculture has benefited from the development of the growth stimulator Acuabio-1 by the CIGB which improves both growth and survival of farmed fish, and has been tested in Cuba, in laboratory and pilot scale tests, and currently being implemented in the National Aquaculture Program and is sponsored by the Ministry of Fisheries.

4. Read the section entitled **Applied Research** and complete the chart.

Application of Biotechnology tools to	Features
	1992 –immunogenic, with excellent safety and efficacy– 12 years of clinical experience
obtain hepatitis-C vaccine	
	based on synthetic oligosaccharides that mimic the natural capsular polysaccharide conjugated with the tetanus toxoid carrier protein. It is immunogenic, safe, and very well tolerated.
	resistant to pests and drought
obtain advanced _____ systems for plant and animal diseases	
obtain and produce _____ for cattle and poultry	
obtain _____ for agriculture	
improve the efficiency of plant and animal _____	
develop transgenic plants	
use plants and animals as _____	

Applied Research

The production of the hepatitis-B vaccine has allowed the Cuban Ministry of Health to comply since 1992 with the recommendations of the World Health Organization (WHO) that all countries should introduce universal hepatitis-B vaccination into their immunisation programmes. After 12 years of worldwide clinical experience, this vaccine has shown to be highly immunogenic, with excellent safety and efficacy profiles to protect against hepatitis-B virus (HBV) infection. (...)

Hepatitis-C virus (HCV) is also a major worldwide health problem and a DNA vaccine formulation based on a construct comprising the genes for the three main structural antigens has been generated.

As a result of the collaboration between the University of Havana and the CIGB, a new conjugated vaccine, for the active immunization against invasive illnesses caused by the bacterium *Haemophilus influenzae* type b, has been developed. The vaccine differs from those already available in its composition. It is based on synthetic oligosaccharides that mimic the natural capsular polysaccharide, conjugated with the tetanus toxoid carrier protein. The vaccine is immunogenic, safe, and very well tolerated, as demonstrated in several clinical trials with children. (...)

The impact of the CIGB in the Cuban agriculture and food production has also been substantial, contributing to the propagation of new plant

varieties which are resistant to pests and drought, providing advanced diagnostic systems for plant and animal diseases, creating and producing vaccines for cattle and poultry, and obtaining bioproducts for agriculture. Several projects apply biotechnology tools for improving the efficiency of plant and animal breeding. These include genomics, proteomics, and

bioinformatics, besides advanced tissue culture techniques. Transgenic plants with resistance to biotic (pest and diseases) and abiotic (drought and salinity) stresses are also under development. Lastly, the use of plants and animals as bioreactors is the goal of several ongoing projects. Among these, are the expressions of the antibodies in plants.

IV. Listening



What's a BLAST?

Hint: It's a bioinformatics program

- Listen to Audiotext 1 and answer these questions:
 - What does BLAST stand for?
 - What is BLAST used for?
 - What examples of biological sequences are given?
- Listen to the audiotext again and focus on the example that illustrates what can be done with BLAST. Fill in the blanks as you listen to the tape.

"For example, following the discovery of a previously unknown _____ in the _____ a scientist will typically _____ a BLAST search of the _____ to see if human beings _____ a similar gene; BLAST will _____ sequences in the human genome that _____ the mouse gene based on similarity of sequence".

V. Speaking

- Based on the information you collected from working with sections **The CIGB's Pipeline** and **Applied Research** prepare a two minute oral presentation in which you will highlight key aspects. (You may be asked to talk about this in the practice session with your classmates and language teacher).
- Make a brief oral comment about the relation you see between your field of study and biotechnology. (You may be asked to talk about this in the practice session with your classmates and language teacher).



Biotechnology in Cuba (II)

Objectives: In this unit you will continue dealing with the layout and features of a **paper**, particularly with the main body and the conclusions. Exercises have been built around other excerpts of the paper **Biotechnology in Cuba: 20 Years of Scientific, Social and Economic Progress** to help you better understand the vocabulary and the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

Expand your vocabulary

Can you complete each of the following statements using one of the words in the list? Each word is to be used twice.

virus - host - pathway

1. A network of interconnecting neurons along which a nerve impulse travels is known as _____.
2. A computer _____ deletes or changes computer information and makes copies of itself that can spread to other computers.
3. A _____ is one of a group of minute infectious agents (20-300 nm long and/or wide) unable to multiply except inside a living cell of a host, of which they are obligate parasites and outside of which they are inert.
4. A _____ is an organism supporting a parasite in or in its body and to its own detriment. It is also an organism supporting (e.g. housing) a non-parasitic organism such as a commensal.
5. The sequence of usually enzyme-catalyzed reactions by which one substance is converted into another is known as a _____.
6. The simplest computer networks consist of a user's computer, known as the client, and a resource computer, called the _____ or server.

II. Begin Reading

Scan through the section entitled **Basic Research** to get information to complete the chart in each line of research.

Line of Basic Research	Scientific discoveries and outcomes
Study of <i>Neisseria meningitides</i>	
Finding of Peptide (P15-Tat)	
Life-cycle of HCV	
Antibody generation	

Basic Research

Applications of the science developed at the CIGB have been supported by the results of basic research with significant usefulness for the world scientific community. The study of the pathogenic bacterium *Neisseria meningitides* leads to the finding of the highly conserved *lpdA* gene codifying for P64k protein. This result was a valuable discovery to obtain a protein carrier useful for vaccine design.

(...) The Laboratory of Molecular Oncology (LMO) has actively been searching for pathways of human oncogenesis inhibition. LMO's research staff found a peptide (P15-Tat) with antitumor effect and this is now in Phase-I clinical trials. This research provided proof-of-concept that P15-Tat or other molecules that block protein kinase 2 (CK2) phosphorylation could be used in cancer therapy.

The life cycle of the Hepatitis-C virus (HCV) has been extensively studied by the CIGB's researchers to explain host-viral interactions. (...) For the first time, the HCV core protein and nucleocapsid-like particles were localised in the nuclei of hepatocytes which is important to understand functions of the viral proteins during HCV infection and to find targets for drug design. (...)

Discovery activity at the CIGB has been driven by the researchers' interest to get a deeper understanding of disease mechanisms and in turn to find useful therapeutic and prophylactic drugs.

Life sciences scientists usually work with complex biological samples to isolate a few molecules by using validated protocols, and trying to keep the integrity of the separated entities. The development of a technique for intact protein isolation is certainly a most promising direction in proteomics. A

procedure for the isolation of proteins by reverse staining was developed by the CIGB scientists.

Antibody generation is another important field of investigation for the CIGB researchers. A novel method to create antibody libraries developed at the institution in collaboration with the Lund University (Sweden) has been cited in more than 40 papers. The procedure consists of linking antigen recognition and phage replication to mimic the immune response in a phage display system. Such a methodology represented a relevant step towards implementing a faster protocol with higher specific enrichment factors.

Cuban discoveries and methodologies available in the published literature are just piece of evidence which shows that Cuban contributions are firmly rooted in current research methods (the CIGB has published 680 peer-reviewed papers in scientific journals, from 1986 to 2006). It is also worth noting that the CIGB's papers have been cited in more than 3,000 papers. These figures demonstrate that the CIGB's results have been useful for the worldwide scientific community.

This paper does not suggest that basic research is the first priority of the CIGB, but the results reported in the literature suggest no current cause for concern on the future of the discovery activities at the institution.

The rationale for exclusively performing pure basic science in a Cuban institution, at present is not clear, because the major factor driving the economic and social development of a developing country is the access to new cutting-edge technologies coming from both, basic and applied research.

III. Keep on Reading

1. In the section entitled **The CIGB's Health Impact** six (6) examples support the contribution made by the CIGB to the field of health. Three of these examples (impacts) have been illustrated in the following figures. Read the section and label each figure.

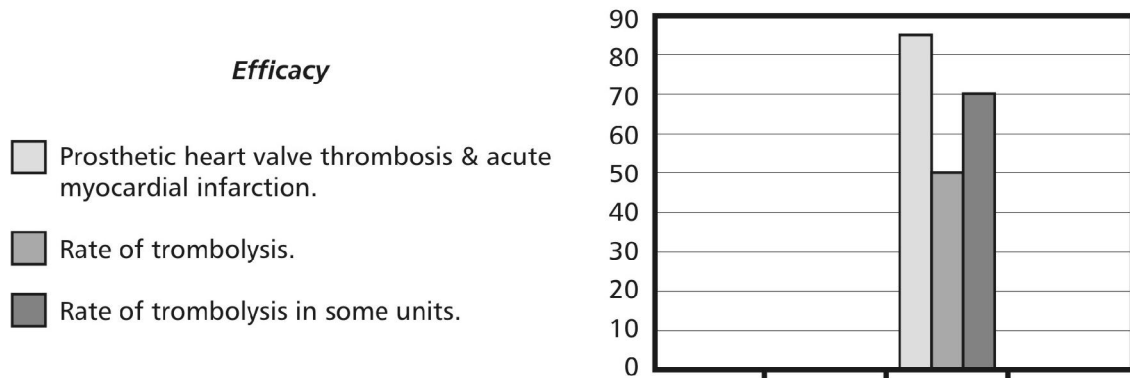


Fig. 1. _____

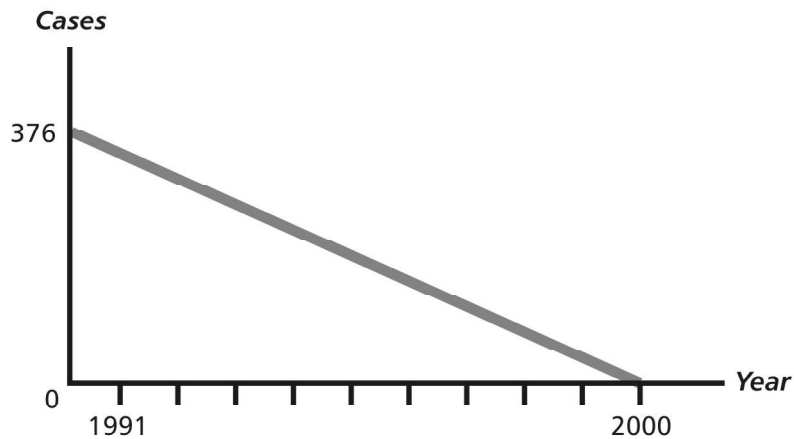


Fig. 2. _____

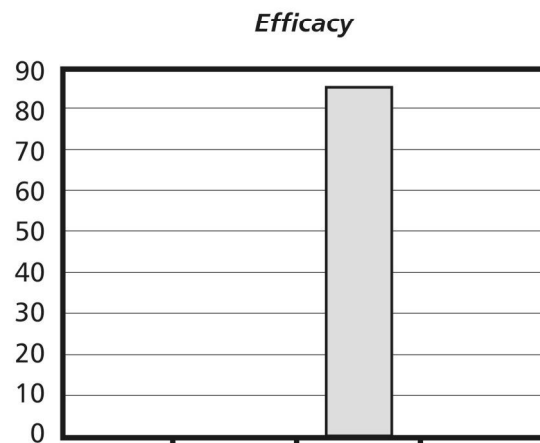


Fig. 3. _____

2. Now read the section again. Take down some notes related to the other three impacts and prepare the response you would give to someone asking you more about the contribution of the CIGB on health. (You may be asked to talk about this in the practice session with your classmates and your language teacher).

The CIGB's Health Impact

Health impact is considerable at the population level in many fields, for example hepatitis-B has disappeared in the infant population. Cuba does not only hope to eradicate this infectious disease in a few years, but also to eliminate the virus circulation. Additional relevant facts supply a picture of the CIGB health impact:

- I. The hepatitis-B vaccine manufactured at the CIGB has reduced the incidence of this infectious disease in Cuba from 376 cases in 1991 to eradication in 2000, it has been on the WHO's list of vaccines purchased by UNO from 2001. \$ 220m worth of vaccine were sold in ten years and 100 million doses have been used.
- II. In clinical trials with the recombinant streptokinase manufactured at the CIGB, 86 per cent efficacy was obtained for the treatment of prosthetic heart valve thrombosis and in acute myocardial infarction; the rate of thrombolysis was around 50 per cent and even 70 per cent in some medical units.
- III. Large-scale production of the first worldwide synthetic vaccine was made possible by the CIGB's staff, a few months after the vaccine discovery. In clinical trials, 99.7 per cent of the test infants reached antibody titres above those considered appropriate for lifelong protection against *Haemophilus influenzae* type b.
- IV. The recombinant humanised antibody against the epidermal growth factor receptor, now in clinical trials for cancer therapy in Cuba and other countries, was transiently expressed in tobacco leaves, correctly assembled and retaining its biological activity.
- V. The Finlay Institute, the CIGB, and the Centre for Bioreagents have overcome the huge challenge of supplying a safe tetravalent vaccine to the Cuban Immunization Program. The new combined vaccine Trivac-HB ® will protect children from four lethal infectious diseases: diphtheria, tetanus, whooping cough, and hepatitis B.
- VI. The new product CITOPROT-P ®, with 85 per cent efficacy for preventing amputation in patients with end-stage diabetic foot ulcers is in the market and the Cuban Health System has started its application.

IV. Writing

1. Read the section entitled **Conclusions** and write an outline about **Factors that have made possible the development of the biotechnology industry in Cuba**. The first key point has been written for you.

- **Universal access to education**
-
-
-
-
-

2. Find information about an industry in Cuba related to your field of study. Write a summary (100-150 words) with your findings (name of the industry/sector; results/products/ lines of research/; contribution of your university study groups to this industry, etc.).

Conclusions

Overall, it must be concluded that the results from developing biotechnology in Cuba have been rewarding. A new industry has been created in a developing country, which is supplying cutting-edge technology products to its people, and is generating significant profits from overseas sales in spite of severe financial constraints. Certainly, there is no evidence showing that a similar scientific, social, and economic phenomenon has taken place in any other country. Similarly, the possibility of a continuous development of this sector of the Cuban economy suggests a promising future for the solution of ongoing national problems. The decision of implementing integration and collaboration between research institutions was right; otherwise, the results would have to be disappointing. Two decades is enough time to make relevant conclusions from a study case: the CIGB. *First*, universal access to education is the most important factor that set up optimal conditions to start the development of a high technology industry. *Secondly*, when several research institutions work in close collaboration for the development of its country, the results are impressive, a vast amount of economic and social problems are solved, and the nation can be proud of its achievements. *Thirdly*, suitable IP policy, projects planning and evaluation, and rational resource allocation allowed the building of a balanced and growing product pipeline that begins to generate new products with

market potentiality when commercialised by a global oriented enterprise. *Fourth*, when such a pool of expert researchers is created they can turn their attention to major problems affecting people on a global scale such as disease pandemics, hunger, and environmental deterioration. *Fifth*, the amount and relevance of contributions to basic and applied research that can generate integration and collaboration between national research institutions is unpredictable, since mutual access to novel approaches and results opens new alternative pathways in the course of each project, increasing its probability of success in a shorter time and with lower R & D costs.

Lastly, and turning to the rationale of the idea, it can be concluded that the concept has been proved, since the new industry has good health after 20 years. But new paradigms have emerged: should all developing countries follow exactly the same pathway? Is the Cuban approach feasible for other emerging industries? What should the starting point be in each case? Here an attempt has been made to draw a route to develop a new industry in a developing country, which has given rise to challenging questions, with the hope of contributing to the solution of the most urgent worldwide problems. Therefore, it is predictable that future discussions on this issue could be of the broadest interest.

A New Bacterium (I)



Objectives: In this unit you will become acquainted with the layout and features of a **scientific article**, particularly with its abstract and the introduction. Exercises have been built around excerpts of the article **A putative new endophytic nitrogen-fixing bacterium *Pantoea* sp. from sugarcane** to help you better understand the vocabulary and the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

Vocabulary Self-Assessment

1. Rate your knowledge of key vocabulary on this topic. Tick (✓) next to the words you can give their Spanish equivalents. Notice the grammatical category (part of speech) in parentheses beside each word in the list.*

__putative (a)	__genus (n)	__stem (n)	__cultivars (n)
__primer (n)	__assays (n)	__tissue (n)	__strain (n)
__endophyte (n)	__culture (n) (v)	__root (n)	__supply (n) (v)
__species (n)	__isolate (n) (v)	__wide (a)	__squash (v)
__nitrogen-fixing (a)	__node (n)	__medium (n)	__sample (n) (v)

*(a) = adjective (n) = noun (v) = verb

2. Look up the new words in a bilingual dictionary and write them down in your notebook.
3. Fill in the blanks with the corresponding word from the previous list.
- a) *Gluconacetobacter diazotrophicus* is a _____ endophyte of sugarcane.
- b) Sugarcane is normally propagated asexually from _____ cuttings, each having two or more nodes.
- c) Isolation and nitrogenase activity _____ were performed in LGI-P medium.

4. Bear in Mind

An abstract

An **abstract** is a summary that serves as an introduction to a scientific paper. It informs the reader of the purpose, scope, and methods used by the researcher(s), as well as the main results attained, recommendations and conclusions. These may be explicitly included as headings or simply referred to in the abstract. An abstract is written using a limited number of words (generally 200-250) and at the beginning, some background information can be included.

II. Begin Reading

Drawing info from the first page of a scientific article

1. Scan through the page and identify the source (journal or magazine where the article was published and the date), information about the author(s) and institutions involved.
2. Scan through the abstract and identify key information contained. (Be ready to present it orally. You may be asked to talk about this in the practice session with your classmates and language teacher).
 - a) What word is used to present the purpose of the research?
 - b) What are the main results of this study?
 - c) What sector of the economy can benefit from this research?

III. Keep on Reading

Drawing info from the **Introduction** of a scientific article

- A. Scan through the **Introduction**, i.e. the preliminary section of a scientific article that explains and leads into the subject of the article. Tick (P) next to information included in the **Introduction** to this article

- ____ Varieties of sugarcane.
- ____ Most common nitrogen-fixing micro organisms previously studied.
- ____ Interest of Cuban researchers in biological nitrogen fixation.
- ____ Morphological characterization and biochemical tests carried out.
- ____ Biological nitrogen fixation importance.
- ____ Isolation and purification of the bacterium.

A Putative New Endophytic Nitrogen-fixing Bacterium *Pantoea* sp. from Sugarcane

F.G. LOIRET,¹ E. ORTEGA,¹ D. KLEINER,² P. ORTEGA-RODÉS¹, R. RODÉS¹ and Z. DONG³

¹ Lab. Fisiología Vegetal, Dpto. Biología Vegetal, Facultad de Biología, Universidad de La Habana, La Habana, Cuba.

² Mikrobiologie, University of Bayreuth, Bayreuth, Germany.

³ Plant Biology Department, St. Mary's University, Halifax, Canada.

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Abstract

F.G. LOIRET, E. ORTEGA, D. KLEINER, P. ORTEGA-RODÉS, R. RODÉS AND Z. DONG, 2004

Aims: To isolate and identify endophytic nitrogen-fixing bacteria in sugarcane growing in Cuba without chemical fertilizers.

Methods and Results: Two N₂-fixing isolates, 9C and T2, were obtained from surface-sterilized stems and roots, respectively, of sugarcane variety ML3-18. Both isolates showed acetylene reduction and H₂ production in nitrogen-free media. Nitrogenase activity measured by H₂ production was about 15 times higher for isolate 9C than for T2 or for *Gluconoacetobacter diazotrophicus* (PAL-5 standard strain, ATCC 49037). The *nifH* gene segment was amplified from both isolates using specific primers. Classification of both T2 and 9C was made on the basis of morphological, biochemical, PCR tests and 16S rDNA sequence analysis.

Conclusions: Isolate 9C was identified as a *Pantoea* species from its 16S rDNA, but showed considerable differences in physiological properties from previously reported species of this genus. For example, 9C can be cultured over a wide range of temperature, pH and salt concentration, and showed high H₂ production (up to 67.7 nmol H₂ h⁻¹ 10¹⁰ cell⁻¹). Isolate T2 was a strain of *Gluconacetobacter diazotrophicus*.

Significance and Impact of the Study: A new N₂-fixing endophyte, i.e. *Pantoea*, able to produce H₂ and to grow in a wide range of conditions, was isolated from sugarcane stem tissue and characterized. The strain with these attributes may well be valuable for agriculture.

Keywords: endophyte, *Gluconacetobacter diazotrophicus*, hydrogen, nitrogen fixation, *Pantoea*, sugarcane.

Introduction

Research on biological nitrogen fixation (BNF) has increased significantly because of its potential importance to the economy and the environment. It has been especially interesting and important to find BNF in nonlegumes like sugarcane, rice, kallar grass and maize (Triplett 1996; Baldani *et al.* 1997, 2002; James 2000; Boddey *et al.* 2003). Nitrogen-fixing bacteria of the genera *Azotobacter*, *Enterobacter*, *Bacillus*, *Klebsiella*, *Azospirillum*, *Herbaspirillum*, *Gluconacetobacter*, *Burkholderia* and *Azoarcus* have been reported in association with a wide range of grasses (Tarrand *et al.* 1978; Rennie *et al.* 1982; Gillis *et al.* 1989, 1995; Baldani *et al.* 1992; Reinhold-Hurek *et al.* 1993; Dong *et al.* 1994). Nitrogen-fixing microorganisms have been reported living in the rhizosphere and

as endophytes of sugarcane cultivars. The most common bacteria isolated from sugar-cane tissues are *Gluconacetobacter diazotrophicus*, *Herbaspirillum rubrisubalbicans* and *H. seropedicae* (Baldani *et al.* 1997, 2002; James 2000; Boddey *et al.* 2003). Other microorganisms such as *Enterobacter cloacae* and *Klebsiella oxytoca* have also been reported to be found inside sugarcane (Sajjad *et al.* 2001).

In Cuba there are almost one million hectares of cultivated sugarcane. The possibility of supplying the nitrogen demand of crops through BNF offers an advantageous way of protecting the study was to isolate and identify other nitrogen-fixing bacteria living within the tissues of field-grown sugarcane in Cuba.

Correspondence to: Eduardo Ortega, Lab. Fisiología Vegetal, Dpto. Biología Vegetal, Facultad de Biología, Universidad de La Habana, Cuba (e-mail: eortega@fq.uh.cu).

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- B. After reading the abstract and the introduction of an article, readers have a more complete idea concerning what type of research the article would be useful for. Can you identify at least two **research topics** (*temas de investigación*) in which you could use this article as reference? One research topic has been written for you. Write your answers in Spanish.

Este artículo puede servir de referencia para temas de investigación relacionados con:

1. La biodiversidad de las bacterias endófitas
2. _____
3. _____

- C. Expand your vocabulary.

1. Complete the chart with the missing word in each corresponding column. The first one has been done for you.

Verb	Noun	Adjective
fix	fixation	fixing, fixed
	removal	
		collaborative
		grown
		locational, local
	isolate, isolation	

2. Complete each sentence with one of the words from the chart. Nouns could be used in plural or singular, verbs in any tense.
- More than 20 _____ differing in colony morphology were purified from sap of internodes.
 - T2 is a strain of *G. diazotrophicus*, with a nitrogen-_____ capacity similar to the type strain PAL-5.
 - It was shown that the strain 9C was able to _____ under anaerobic and aerobic conditions.

IV. Listening and Speaking



1. Listen to Audiotext 2 to complete the missing information about a related experiment.

- Nationality of the researchers involved in the experiment: _____ and _____
- Participating institutions: _____ and _____
- Purpose of the study: To _____ an _____ somewhere in _____.
- Preliminary belief concerning location of bacteria: _____ the xylem of the _____, of the _____.
- Reasons for rejecting such belief: _____



2. Listen to Audiotext 3 to complete the missing information about the way the experiment was conducted and the results attained.

- equipment used : electron _____.
- Some bacteria were found in the _____ the _____, not _____ the _____, but in the spaces _____ the parenchyma _____.
- technique used: one by which the researcher.... _____
- Result from removing fluid: _____
- Scientific impact: _____

3. Using the data you collected from Audiotexts 2 and 3 prepare a one-minute oral presentation of this experiment. (You may be asked to share your information during the practice session).

V. Writing

Practice writing an abstract following the layout given in this unit. Based on the information you collected from Audiotexts 2 and 3; write an abstract (220-250 words) for an article entitled **An experiment to locate N₂-fixing endophytic bacterium.**



A New Bacterium (II)

Objectives: In this unit you will continue dealing with the layout and features of a **scientific article**, particularly with its main body which is made up of three sections: Materials and Methods, Results, and Discussion. Exercises have been built around excerpts of the article. **A putative new endophytic nitrogen-fixing bacterium *Pantoea* sp. from sugarcane** to help you better understand the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

Some of these excerpts belong to the section **Material and Methods** (M & M) and some others to the section **Results** (R). Read them carefully and anticipate the section each excerpt is taken from.

- a) "Canes (Cuban variety ML3-18) from a sugarcane field were sampled". ____
- b) "Only two of these (bacteria) were able to reduce acetylene, one (designated T2) from roots, and the other (9C) from internode sap". ____
- c) "Pieces of stems were washed with tap water and soaked in 5% chloramines T solution (2 min)". ____
- d) "In contrast *E. coli* showed a band of 250 bp". ____
- e) "Colonies of T2 became orange in LGI-P medium after 7 days, while colonies of 9C were uncolored". ____
- f) "The isolates showed similar nitrogenase activity as the well characterized endophyte *G. diazotrophicus* PAL-5...". ____
- j) "Root pieces were squashed in 1 ml of sterile 5% sucrose solution..." ____
- h) "Apoplastic sap was collected by centrifugation" ____
- i) "The isolates were grown on LGI-P plates for 5 days". ____
- j) "This bacterium was able to grow from 20° to 42° C" and at a wide range of initial pH in the culture media". ____

II. Begin Reading

1. Scan through the excerpts of the sections **Materials and Methods** and **Results** and confirm what you anticipated.

2. Read the excerpt from the section **Materials and Methods** and complete the chart

Solutions and substances used	Solid materials used	Methods used

Materials and Methods

Isolation of bacteria

Canes (Cuban variety ML3-18) from a sugarcane field which had not been fertilized for more than 10 years were sampled. Roots from cleaned sets germinated under clean laboratory conditions were surface sterilized as follows: washed with sterile distilled water, 5% chloramine T in H₂O (5 min), 70% ethanol (5 min); and finally rinsed three times with sterile distilled water. Root pieces were then squashed in 1 ml of sterile 5% sucrose solution and 100 μ l aliquots were inoculated into semisolid LGI-P medium (Dobereiner *et al.*, 1993). Internode isolates were obtained from the sap of apical internodes of canes from the same variety. Pieces of stems were washed with tap water and soaked in 5% chloramine T solution (2 min). The rind was removed with a sterile sharp knife, and the cylinder of parenchyma tissue rinsed with 70% ethanol and flamed. Apoplastic sap from the internodes was collected by centrifugation following the method of Dong *et al.*, (1994). Serial dilutions of root extracts and internode sap were inoculated into solid LGI-P medium, and counts of colony-forming units (CFU) of each morphologically different colony type determined after 7 days. Isolates were subcultured from each colony to obtain pure cultures. They were then tested for nitrogenase activity with the acetylene reduction assay (ARA) (Hardy *et al.*, 1968).

Those isolates that reduced C₂ H₂ were then subjected to further tests to determine their specific characteristics.

DNA extraction

The isolates were grown on LGI-P plates for 5 days; cells were collected and washed with 5% sucrose solution. *Escherichia coli*, as control was grown overnight in LB medium. The protocol of Ausubel *et al* was followed.

Results

Isolation and purification of nitrogen-fixing bacteria

More than 20 isolates differing in colony morphology on LGI-P medium were subcultured and purified from sap of internodes and roots squashes. Only two of these were able to reduce acetylene; one (designated T2) from roots, and the other (9C) from internode sap. The population of T2 in roots was 10^3 - 10^4 cells g⁻¹ tissue, while that of 9C was 10^4 - 10^5 cells ml⁻¹ of sap in the internodes. Isolate 9C grew in different rich media (potato agar, nutrient broth and Saubouraud agar dextrose) or minimal media (LGI-P, JNFb and NFB). By contrast, isolate T2 grew only in media LGI-P and potato agar. Colonies of T2 became orange in LGI-P medium after 7 days, while colonies of 9C were uncoloured translucent at the beginning,

and became orange translucent after 9-10 days. In addition, T2 produced brown colonies in potato agar medium whereas 9C produced tan colonies.

The isolates showed similar nitrogenase activity (ARA) as the well characterized endophyte *G. diazotrophicus* PAL-5, with values from 1-3 to 3-1 nmol of ethylene produced per 10^{10} cells h^{-1} . In contrast, nitrogenase activity measured by hydrogen production revealed differences among the strains. Among the nitrogenase proteins, the NifH subunit is the most conserved.

The conserved primers nifH-R and nifH-F amplify the target *nifH* gene segment in a wide range of N₂-fixing organisms (Rösch *et al.* 2002). This tool was used to confirm that the isolates 9C and T2 are N₂-fixing bacteria; as expected T2, 9C

and *G. diazotrophicus* showed bands at about 500 bp. In contrast *E. coli* showed a band at 250 bp. We do not have an explanation for the band amplified in this experiment by *E. coli* K12.

Growth characteristics of isolate 9C

The strain 9C was able to grow under anaerobic and aerobic conditions and shows good adaptability to high temperature, high pH and high osmotic pressure. This bacterium was able to grow from 20 to 42° C, and at a wide range of initial pH in the culture media. In addition it grew (10^8 cell ml^{-1} in 5 days) and reduced acetylene (2-7 nmol produced per 10^8 cell h^{-1}) in medium LGI-P supplied with 30% sucrose, and showed pellicle formation in semisolid LGI-P medium with 10% NaCl.

III. Keep on Reading

Scan through the excerpts from the section **Discussion** and complete the chart.

Features	
Bacterium (9C) species/ genera	
Biochemical characteristics:	
Different from <i>Klebsiella</i> because:	
Different from <i>Enterobacter</i> because:	
Different from <i>P. agglomerans</i> because:	
Capacity to:	
Ability to:	

Discussion

From its morphological, biochemical and molecular features isolate T2 is a strain of *G. diazotrophicus*, with a N₂-fixing capacity similar to the type strain PAL-5. The morphological and biochemical characters of isolate 9C, however, do not match

completely the pattern of any sugarcane endophyte previously reported.

Till now, the most common nitrogen-fixing bacteria reported as endophytes in sugarcane have been *G. diazotrophicus*, *Herbaspirillum spp.* and less

often *Azospirillum* spp. (Baldani *et al.*, 1997, 2002; James 2000; Baldani *et al.*, 2002; Boddey *et al.*, 2003). Species of *Enterobacteriaceae* have been reported only in association (not as endophytes) with sugarcane or other grasses; *Enterobacter* (Boddey *et al.*, 1991; Sajjad *et al.*, 2001), *Klebsiella* (Sajjad *et al.*, 2001), *Enterobacter cloacae* and *Erwinia herbicola* (now *Pantoea agglomerans*) the latter found only on the exterior of the plant (Rennie *et al.*, 1982).

The three possible genera for systematic classification of isolate 9C are *Klebsiella*, *Enterobacter* and *Pantoea*. This new isolate does not fit the characteristics of *Klebsiella* (Holt *et al.*, 1994) because it has flagella. Also, it is positive for ornithine and lysine decarboxylase and for cytochrome c oxidase; moreover it is negative for nitrate reductase. Neither does it fit into *Enterobacter* (Holt *et al.*, 1994), because it is negative to the Voges-Proskauer test and to the gelatine liquefaction assay.

Because of the features discussed above and the fact that *Pantoea* achieved the highest percentage of similarity, some biochemical characteristics are strikingly different. Moreover, different from *P. agglomerans* (Iimura and Hosono, 1996; Koneman *et al.*, 1997), strain 9C is positive for ornithine decarboxylase activity (Table 1).

Researchers have reported that the complex *Erwinia herbicola*–*Enterobacter agglomerans* is heterogeneous and thus contains various kinds of bacterial strains that have different phenotypes and genotypes (Mergaert *et al.*, 1984; Kageyama *et al.*, 1992). Although we have found some differences in biochemical characteristics between 9C and *Pantoea* spp., according to all the evidence, we propose that the new isolate 9C is a species of *Pantoea*, endophytic in sugarcane tissues, with several differences from the *Pantoea* species described so far.

Table 1. Morphological and biochemical characteristics of isolate 9C.

Characteristic	Isolate 9C
Shape*	round rod
Size* (µm)	0.8-1.3
Flagella*	peritrichous
Gram strain	negative
Colony color in potato agar	beige
Oxidase c	+
Voges-Proskauer	-
Catalase	+
Growth in 3% NaCl	+
NO ₃ ⁻ reductase	-
Use of sucrose in N free medium	+
Gelatine hydrolysis	-
Starch hydrolysis	-
Yeast activity	+
Ornithine decarboxylase	+
H ₂ S production	+
Indole production	-

* Growing in LGI-P solid medium

A remarkable characteristic of 9C is its capacity to produce considerable amounts of hydrogen. The large discrepancy between hydrogen evolution and ARA leads us to hypothesize that another source of hydrogen beside the nitrogenase enzyme could be present in isolate strain 9C. Nitrogenase activity measurements were conducted in 10% acetylene, a condition where virtually all electrons moving through the enzyme are used to reduce C₂H₂ and few, if any reduce protons or nitrogen (Layzell and Atkins, 1997). Even in that condition 9C produces about 15 times more hydrogen than *G. diazotrophicus*.

Another important feature of isolate 9C is its ability to grow where the water activity was as low as 0.95 (10% NaCl). By contrast, the optimum growth for most microorganisms is an activity of 0.98 (seawater) or higher (Prescott *et al.*, 1993). Together with the wide pH range and temperature tolerance this ability encourages us to make further investigations of this versatile bacterium, including experiments in applied microbiology.

IV. Listening and Speaking



1. Listen to Audiotext 4 about the characterization of a bacterium. Compare this bacterium to the bacterium characterized in the article. Complete the chart.

	Audiotext 4	Scientific article
Name of the bacterium		<i>Pantoea. sp</i>
Common features	Nitrogen-fixing bacteria	
Other features	<ul style="list-style-type: none"> - Fixes nitrogen from the _____ in the presence of _____ - Lives in a _____ sugar concentration - Lives at a _____ pH 	<ul style="list-style-type: none"> - Capable of producing great amounts of H₂ - Reduces acetylene in nitrogen-free media - Lives in a wide range of temperature, pH and salt concentration - Able to grow when water activity is low

2. Based on the chart prepare an oral presentation. (You may be asked to talk about this during the practice session).

V. Writing

In about 150 words, write –in Spanish– the features of the new bacterium found by Loiret *et al.* and include the scientific significance and impact of this finding.

Antioxidants, Micronutrients and HIV



Objectives: In this unit you will deal with the layout and features of a **review article**. Exercises have been built around excerpts of the article **Antioxidants, Micronutrients and Human Immune Deficiency Virus (HIV)** to help you better understand the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

A. What do you know about antioxidants?

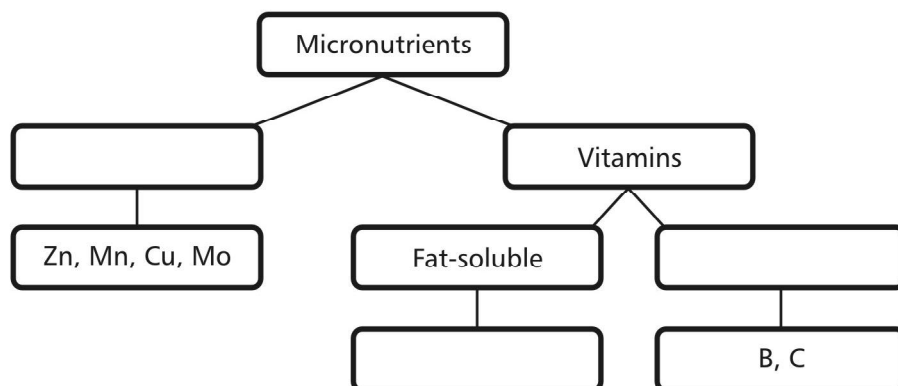
Organize the following chunks, so as to write

1. The definition of an antioxidant
2. Way in which antioxidants prevent cell damage
3. Two examples of antioxidants
 - a) such as carotenoids and flavonoids **In addition** - and certain plant chemicals - vitamins C and E - are antioxidants
 - b) block - a chemical reaction in which a substance loses electrons - **Antioxidants** - often while combining with oxygen - the effects of oxidation
 - c) that are antioxidants - certain enzymes - naturally produces - **The body**
 - d) that may prevent - **An antioxidant** - cell damage - any of a group of chemical compounds - certain types of- is

B. What do you know about micronutrients?



1. Listen to Audiotext 5 and learn about micronutrients. Complete the diagram while listening to the recording.
2. Based on the diagram, write the definition of the term **micronutrients**. Check the pronunciation of each word. (You may be asked to talk about this during the practice session with your classmates and language teacher).



C. Bear in mind

A review article is a category of scientific paper which provides a synthesis of research on a topic at that moment in time. If you want to find out what the key articles are for a given topic, review articles are virtual gold mines. In a review article one or more writers sum up the state of the art in research on a particular topic. Unlike research articles, review articles are good places to get a basic idea about a topic. Review articles will teach you about:

- the main people working in a field
- recent major advances and discoveries
- significant gaps in the research
- current debates
- ideas of where research might go next

state of the art = *lo más novedoso, lo último*

II. Begin Reading

1. Scan through the introduction to identify the particular topic being reviewed. Write it down in your notebook.
2. Scan through the introduction again and identify the direct relationship between nutrition and HIV infected population.

III. Keep on Reading

1. Scan through the section entitled **The Origins of Acquired Immunodeficiency Syndrome (AIDS)** and complete Charts A and B.

Chart A. One rejected theory about the origin of HIV

_____ of HIV-1	chimpanzee
Via of contamination for humans	
	Chimpanzee tissues used in the preparation of OPV

Chart B.

Sexual intercourse
Intravenous drug use

REVIEW ARTICLE

Antioxidants, Micronutrients and Human Immune Deficiency Virus (HIV)

DR. LIZETTE GIL PHD.

Department of Clinical Pharmacology, Institute of Tropical Medicine “Pedro Kourí”, Havana, Cuba

DR. RICARDO FERREIRA

Centro de Medicina Biomolecular, Buenos Aires

Introduction

HIV infection and its evolution lead to an increased requirement for nutritional indexes. Insufficient dietary intake and increased requirements contribute to the development of micronutrients deficiency. This has been observed in many HIV-infected populations, and numerous studies have reported that these deficiencies impair immune responses, weaken cell integrity and function, and are associated with accelerated HIV disease progression. Strong evidence from observational studies has led to interest in the potential of micronutrient supplementation as a cost-effective strategy for preventing vertical HIV transmission, particularly in countries where antiretroviral and prophylactic drugs are unavailable. It is possible that prolongation of the interval between infection and symptoms observed over the last decade might relate in part to better nutrition.

Other studies have also demonstrated a decreased antioxidant status as well as an increased oxidative damage in patients with HIV infection. This article comments these aspects and also reviews the epidemiological evidences that micronutrients and antioxidants may confer benefit to HIV infected patients.

The origins of Acquired Immunodeficiency Syndrome (AIDS)

Debate around the origin of AIDS has sparked considerable interest and controversy since the beginning of the epidemic. However, in trying to identify where AIDS originated, there is a danger that people may try and use the debate to attribute blame for the disease to particular groups of individuals or certain lifestyles.

The process where certain viruses can pass from animals to humans is referred to as zoonosis. It is now generally accepted that HIV is a descendant

of simian immunodeficiency virus. Certain simian immunodeficiency viruses bear a very close resemblance to HIV-1 and HIV-2, the two types of HIV. It is claimed by researchers that chimpanzees were the source of HIV-1, the more virulent strain of HIV, and that the virus at some point crossed species from chimpanzees to human. However, it was not necessarily clear that chimpanzees were the original reservoir for HIV-1 because chimpanzees are rarely infected with HIV-1.

The theory that HIV-1 may have crossed into humans as a result of contamination of the oral polio vaccine (OPV) when chimpanzee tissues were allegedly used in the preparation of OPV has been recently refuted.

It is probable that scientists will never know exactly when and where the virus first emerged, but what is clear is that some time in the middle of the 20th century, HIV infection in humans developed into an epidemic that may have contributed to the sudden spread even at international level of the blood industry and drug use.

The role of international travel in the spread of HIV was highlighted by the case of “Patient Zero” identified in 1980 as a French-Canadian flight attendant of very promiscuous homosexual habits. In 1982, after major research by the Centers of Disease Control, a link was found between this man and nineteen homosexual patients dying from a bizarre condition. At that time it was thought that the disease was transmitted only by sexual contact with an infected person. Later it became clear that blood transfusions became an important mechanism of transmission.

In some countries, including USA, paid donors were used without excluding intravenous drug users. This blood was then sent worldwide. Also, in the late 60s hemophiliacs began to benefit from the blood clotting properties of a product called Factor VIII. However, to produce the coagulant, blood from thousands of

individual donors had to be pooled. Factor VIII was then distributed worldwide making it likely that hemophiliacs could become exposed to new infections. The 1970s saw an increase in the

availability of heroin following the Vietnam War and other conflicts in the Middle East which helped stimulate a growth in intravenous drug use and this became an important source of contamination.

2. Read this short section entitled **Epidemiology** and write down the statistics reviewed:

- amount of people infected with HIV in 2003: _____
- amount of new cases: _____
- places mostly affected by AIDS and %: _____
- affected age group (%): _____

Epidemiology

More than 40 million people worldwide were infected with HIV by the end of 2003, and 5.3 million new cases were identified during the past year. About 95% of HIV infections are found in developing countries: sub-Saharan Africa, South

Asia and Southeast Asia have been the most severely affected by the AIDS epidemic. More than 10% adults, including 15-30% of women attending prenatal clinics in urban centers of sub-Saharan Africa are infected with HIV.

3. The next section presented in this review article is **Structure of HIV and its mechanisms of action**. Based on the following chart prepare an oral presentation of the main ideas reviewed in the section:

Structure of HIV and its mechanisms of action

HIV discoverer	French investigator Luc Montagnier
Date	1983
Class of virus	Retrovirus
Features	<ul style="list-style-type: none"> - have genes composed of RNA molecules - outer shell: viral envelope (a lipid bilayer derived from the host cell plasma membrane) - embedded in the envelop is a complex protein: env (an outer protruding cap <i>glycoprotein: gp120</i>) - can only replicate within a living host cell - use RNA a template to make DNA
Process of HIV infection	<ol style="list-style-type: none"> 1. HIV encounters a T-helper cell with a surface molecule called CD4 (e.g. lymphocytes T helper, macrophages, neutrophils, enterocytes and glyal cell. 2. virus particle uses gp120 to attach itself to cell membrane 3. virus enters the cell 4. virus particle releases its RNA and it is converted into DNA by enzyme reverse transcriptase 5. New HIV DNA moves into cell nucleus and then inserted into the host cells DNA by enzyme integrase 6. When in the cell genes, HIV-DNA is called <i>provirus</i>.
Hallmark of HIV infection	Immunodeficiency & progressive CD4 T lymphocyte depletion

4. Read the excerpts below from the section entitled **Oxidative stress in HIV infections**. Arrange the ideas and write a one-paragraph summary of the reviewed information.

Oxidative Stress in HIV Infections

- a) “Of the mechanisms contributing to this progression, oxidative stress induced by the production of reactive oxygen species (ROS) or free radicals may play a critical role in the stimulation of HIV replication and the development of immunodeficiency and the degenerative evolution of individuals”._____
- b) “Excessive production of ROS (...) may be related to an increased activation of polymorphonuclear leukocytes during infections ...”._____
- c) “HIV infection induces a wide array of immunologic alterations resulting in the progressive development of opportunistic infections and malignancy which results in AIDS”._____
- d) “In view of the diminished oxidative resistance of HIV-infected individuals, these results suggest that ROS-mediated apoptosis might contribute to the depletion of lymphocytes and to the pathogenesis of the disease”._____
- e) “Another source of ROS is the viral Tat protein...”._____
- f) “Several investigators have proposed that apoptosis initiated by oxidative stress is the direct cause of lymphocyte loss in patients infected with HIV”._____
- g) “Observations showed that free radical-induced apoptosis by a non cytokine-mediated mechanism was significantly enhanced in HIV-infected subjects...”._____
5. Analyze the chart from the section entitled **Oxidative stress markers, micronutrients, and antioxidants in HIV-infected patients** and write a paragraph summarizing the studies carried out.

Study	1	2	3	4
Researcher Date of publication	Allard <i>et al.</i> 1998	Gil <i>et al.</i> 2003	Gil <i>et al.</i> 2005	Team of researchers 2003
Institution, country	University of Toronto, Canada	Instituto Pedro Kourí, Havana, Cuba	Instituto Pedro Kouri, Havana, Cuba	University of Bergen, University of Oslo, Norway & Yirga Alem Hospital, Ethiopia
Subjects	49 HIV positive asymptomatic patients without opportunistic infections	85 individuals with symptomatic or asymptomatic HIV infection	1-10 year old seropositive children	125 Tuberculosis patients with (25) and without HIV infection (100)
Control group	15 healthy seronegative non-smokers matched for age and risk	40 healthy individuals	healthy children	70 healthy subjects

Study	1	2	3	4
Result	- lipid peroxidation significantly higher in the experimental group - plasma antioxidant vitamins in HIV - positive subjects significantly lower	- antioxidant defences significantly reduced in HIV seropositive - markers of oxidative stress such as MDA significantly increased	- Further evidence of oxidative damage to different molecules - increased oxidative markers for lipids and significant decrease of the antioxidant defences	- concentrations of antioxidant Vit C, E & A significantly lower in tuberculosis patients-lower antioxidant defenses and higher MDA

You may begin like this:

This section describes numerous studies to determine oxidative stress in HIV...

6. Next, the following four sections are presented: (1) Vitamin C inhibits the replication of HIV, (2) B Vitamins (3) Other micronutrients and (4) Clinical evidence of the benefits of micronutrients and antioxidants in HIV infection. Read each of the statements below taken from these sections and identify the section each statement belongs to.

- ___ Nutritional status may play an important role in humoral and cell mediated immune function.
- ___ A high intake of B vitamins and the use of vitamin b supplements were also associated with improved survival in this cohort.
- ___ Selenium and probably iron are the only trace elements that remained as independent predictors of mortality after multivariate adjustment.
- ___ Vitamin C may suppress HIV production by inhibiting the activity of viral enzymes involved in protein processing..
- ___ Studies focused on beta carotene and Vitamin A gave disparate results and presently are not considered of benefit in HIV-infected patients.
- ___ A high intake of B vitamins and the use of vitamin b supplements were also associated with improved survival in this cohort.
- ___ Micronutrients deficiencies in HIV-infected patients impair immune responses increasing the risk of infection, HIV disease progression, and in pregnant women, the risk of vertical transmission.
- ___ Continuous exposure of HIV-infected cells to noncytotoxic vitamin C concentrations resulted in significant inhibition of virus replication in infected CD4+ cells.

IV. Writing

1. Read the conclusions to get information to answer the following questions in paragraph form.
 - a) What's the role of micronutrients and antioxidants in HIV positive patients?
 - b) What has been suggested to diminish the action of HIV?
 - c) What piece of advice is given regarding micronutrients administration?

Conclusions

Numerous studies have clearly demonstrated that HIV positive individuals have increased oxidative damage and this is associated with lower levels of micronutrients and antioxidants. On these bases, epidemiological studies evidenced that low intake of micronutrients and antioxidant was inversely related to CD4+ counts and progression of the disease.

Micronutrient supplements have been proposed as low-cost immunomodulating interventions that may slow the progression of HIV disease. It is important during the supplementation to recognize

between the micronutrients administration as nutritional factor for immune response and the pharmacological use of high doses of them as preventive therapy in HIV infection. A recent control trial demonstrated that multivitamin supplementation delayed the progression of disease among HIV infected women. In the light of these observations, the administration of multivitamins, except Vitamin A, becomes advisable in HIV infected people before the initiation and during antiretroviral therapy.

2. For the bulletin board of your school write a note in Spanish (100-150 words) regarding antioxidants, micronutrients, and HIV.

UNIT 6

A New Vaccine Developed in Cuba

Objectives: In this unit you will become acquainted with the layout and features of a **report**. Exercises have been built around excerpts of the report **A Synthetic Conjugate Polysaccharide Vaccine Against *Haemophilus influenzae* Type b** to help you better understand the vocabulary and the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

A. Match column A with column B to get ideas related to the immune system.

A	B
1. The immune system is their patients vaccines to help protect them from certain severe, life-threatening infections.
2. Pathogens are a group of cells, molecules, and tissues that help defend the body against pathogens and other harmful invaders.
3. The immune system reacts to disease-causing organisms, such as bacteria, fungi, parasites, and viruses.
4. The substances that trigger pathogens through a series of steps known as the immune response.
5. Physicians give the body's ability to defend itself against particular types of viruses or bacteria.
6. Vaccines and serums boost an immune response are called antigens.

Notes:

trigger = *desencadenar*

boost = *estimular, fomentar, potenciar*

B. Bear in mind

A **report** is a written document describing the findings of some individual or group. A scientific report is a formal report giving details of the investigation and results of a scientific problem.



II. Listening and Speaking

Listen to Audiotext 6 and complete the chart. Be ready to make an oral presentation of this chart. (You may be asked to talk about this during the practice session with your classmates and language teacher).

	Meningitis
Definition	
Consequences	
Pathogens	
Symptoms	
Diagnosis	

III. Begin Reading

- Here is the first page of the report. Read its title. Think of an appropriate version of this title in Spanish. Write it down in your notebook.
- Read the abstract and draw out information related to:

Type of vaccines effectively used against bacterial diseases	
Characteristics of the new vaccine produced in Cuba	
Evidence offered	

REPORTS



A Synthetic Conjugate Polysaccharide Vaccine Against *Haemophilus influenzae* Type b

V. VEREZ-BENCOMO *et al.*

Center for the Study of Synthetic Antigens, Facultad de Química, Universidad de La Habana, La Habana, Cuba. CP. 10400 vicente@fq.uh.cu

Glycoconjugate vaccines provide effective prophylaxis against bacterial infections. To date, however, no commercial vaccine has been available in which the key carbohydrate antigens are produced synthetically. We describe the large-scale synthesis, pharmaceutical development and clinical evaluation of a conjugate vaccine composed of a synthetic capsular polysaccharide antigen of *Haemophilus influenzae* Type b (Hib). The vaccine was evaluated in clinical trials in Cuba and showed long-term protective antibody

titers that compared favorably to licensed products prepared with the Hib polysaccharide extracted from bacteria. This demonstrates that access to synthetic complex carbohydrate-based vaccines is feasible and it provides a basis for further development of similar approaches for other human pathogens.

IV. Keep on Reading

Haemophilus influenzae type b (Hib) is an important human pathogen and was prevalent in developed countries until the introduction of successful conjugate vaccines during the 1990s. However in developing countries more than 600,000 infant deaths occur annually as a result of Hib-induced pneumonia or meningitis. Extensive use of the polysaccharides as vaccines has offered a useful way to protect adults and older children, and further improvement in generating long-lasting immunity, especially in infants, has been achieved by covalently coupling the polysaccharide to carrier proteins. In fact, the high level of success attained by Hib glycoconjugate vaccine has been quickly followed by similar approaches to meningococcal group C and *Streptococcus pneumoniae*. Many candidate vaccines against other pathogens using the same principles are currently at different stages of research.

The fragment of the Hib capsular polysaccharide used in some of the licensed vaccines can be as short as five ribosylribitol-phosphate repeating units. The ability of synthetic carbohydrate chemistry to mimic such fragments has been demonstrated in several laboratories with the use of stepwise multistep preparation; the resulting

synthetic antigens have served as components of candidate vaccines that have proven efficient in generating immunity in animals. We set out to develop a synthetic methodology amenable to large-scale good manufacturing practice (GMP) production of antigens by reassembling Hib polysaccharide fragments. The previous process was redesigned to include a synthetic pathway with a reduced number of reaction and chromatography purification steps. We also identified a potentially superior method for oligomerization of the ribosylribitol-phosphate repeating unit, in which the saccharide fragment encompassing the key conformational epitope can be obtained in a single step.

To this end, we selected suitably protected ribitol derivative **1** and ribose acetate **2** because they best fit the criteria for large-scale production as synthetic intermediates and could be more readily purified than others derive from D-glucose. The use of crystalline peracetylated β -D-ribofuranose was found to readily glycoside ribitol derivative to provide **3a**. The successful large-scale synthesis of ribosylribitol derivatives **4** and **5** from **3a** as described thus represented one of the key features of our strategy.

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1. Read the **introductory** paragraph in the first page and draw out information about:
 - a) The action of Hib in developed and developing countries
 - b) Age-groups protected against Hib with polysaccharide vaccines
 - c) How the vaccine has been improved to generate long-lasting immunity
 - d) Other pathogens as targets of new vaccines following similar approaches
2. Use the information you collected in a) and prepare a one-minute oral presentation. (You may be asked to talk about this during the practice session with your classmates)

2. Use the information you collected in a) and prepare a one- minute oral presentation. (You may be asked to talk about this during the practice session with your classmates and language teacher).
3. Scan through the rest of the paragraphs in the first page and answer these questions in paragraph form.
 - a) How many repeating units does the fragment (of Hib capsular polysaccharide) from previous vaccines have?
 - b) How can the fragments be mimicked?
 - c) What two important steps have been included in the synthesis to improve the process?
 - d) What materials are used in the process? Why?
4. Read Excerpt 1 in order to find answers to the following questions. (Write down your answers and practice the pronunciation of new words. You may be asked to talk about this during the practice session).
 - a) How did researchers solve the difficulties of large-scale production of oligomers?
 - b) How do synthetic oligomers compare to the ones used in previous vaccines?
 - c) What are the characteristics of the new vaccine produced using a more relevant protein carrier?
5. Translate into Spanish the four key issues researchers identified in this study for further development of the vaccine. (You may be asked to hand in this translation to your language teacher).

Excerpt 1

Although construction of oligomers with controlled numbers of repeating units by solution and solid-phase techniques was possible in small quantities, their large-scale synthesis proved more difficult. To overcome this, we undertook a one-step polycondensation reaction with the use of H-phosphonate chemistry. Thus the phosphate containing end residue and H-phosphonate derivative were oligomerized in high yield and purity with the use of pivaloyl chloride as a polycondensation reagent. Although this reaction is complex; (...) the desired oligomers were obtained avoiding several competing side reactions such as O-acylation.

Synthetic oligomers of **6a** with an average of eight repeating units were reproducibly obtained in high yield (805) after purification by size exclusion

chromatography. Deprotection and azide reduction of **6a** to the amine **6b** which after treatment with 3-maleimidopropionic acid N-hydroxysuccinimide ester gave **7**. The overall process accomplished under GMP proceeded with a high yield and was amenable to a 100-g scale per batch.

A vaccine prototype was subsequently produced. As a potentially more relevant protein carrier for synthetic oligosaccharides, a tetanus toxoid (TT) conjugate was evaluated in animals. This polyribosylribitol (sPRP-TT) conjugate was immunogenic in rabbits with a wide range of sPRP/protein ratios, inducing a strong and specific antibody response. At this point, we identified four key issues that allowed us to accomplish further development of the polyribosylribitol phosphate-Toxoid Tetanus

(sPRP-TT) as a vaccine candidate I. a synthetic pathway to disaccharide derivative with only one chromatographic purification step, making it amenable to GMP production, II. a single step high yielding polycondensation reaction for the

elongation of the oligosaccharide chain, III. a method for careful removal of protective groups, yielding highly pure sPRP and lastly IV. a conjugation process to TT carrier that incorporated sPRP in good yields.

V. Writing

Use the following four chunks as the basis for writing a one-paragraph conclusion of the report. You need to make some additions to make up suitable sentences with each chunk. The first chunk has been organized for you.

1. study - demonstrate: sy nthetic capsular antigen - produce - large scale - under GMP conditions - use - to manufacture effective vaccine - human use
2. resulting vaccine - synthetic bacterial carbohydrate antigen - demonstrate to be - safe and immunogenic in humans as - vaccines - native polysaccharide
3. synthetic complex carbohydrate - based vaccines - feasible - provide - alternative strategy - fight - Hib infections
4. study - set the stage for further development - similar approaches - against other human pathogens

Begin your conclusive remarks like this:

The present study demonstrates that a synthetic capsular polysaccharide antigen can be produced on a large scale under GMP conditions and used to manufacture an effective vaccine for human use...

Additional Text



Objectives: In this unit you will find an additional text. It is a scientific article entitled **Dynamics of the Physical and Chemical Characteristics of the Waters from a System of Livestock and Urban Residues** with interesting activities to help you better understand the vocabulary and the main points discussed by the authors. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

Vocabulary Self-Assessment

Fill in the blank with a chemical element from the list.

Aluminum (Al) - Chlorine (Cl) - Phosphorous (P) - Polonium (Po) - Radium (Ra) - Sodium (Na) - Uranium (U) - Zinc (Zn)

1. One of the most familiar _____ compounds is the common table salt.
2. The first complete study of _____ was published in 1746 by Andreas Sigismund Marggraf, a German chemist.
3. Marie and Pierre Curie discovered _____ in 1898. The name given to this element honored Poland, the country where Marie Curie was born.
4. _____ is the second heaviest element found in nature. Only Plutonium is heavier. It is the source of energy used to generate electric energy at all large commercial nuclear power plants.
5. In nature, _____ exists only in compounds. It is found mainly in chloride minerals, of which the best known is sodium chloride.
6. _____ is a non-metallic chemical element. It occurs in nature as a colorless, odorless, and tasteless gas.

II. Begin Reading

Drawing info from the title, the abstract and the introduction of a scientific article

You are already familiar with the layout of a scientific article. Below you will find the first page of a scientific article.

1. Read the title and think of two physical and chemical characteristics of residual waters.

Journal of Agricultural Science, Volume 39, No. 3. 2005

Dynamics of the Physical and Chemical Characteristics of the Waters from a System of Livestock and Urban Residues

TANIA PÉREZ,¹ TAIMÍ CARRASCO,¹ and L.A. NÚÑEZ²

¹ Instituto de Ciencia Animal, Apartado Postal 24, San José de las Lajas, La Habana. Email: taniap@ica.co.cu.

² Área de Ingeniería Química, Departamento de Biotecnología y Ciencias de los Alimentos, Universidad de Burgos, España.

For characterizing the residual waters from the Institute of Animal Science, a sampling was performed for three days taking samples at the entrance of the Treatment Plant from 10:00 a.m. to 6:00 p.m. with a frequency of 2 h. An analysis of variance according to completely randomized design was performed to the samples to compare, in time, the physical and chemical indicators and the statistics were calculated for the integral sample. In these conditions, there were differences compared to time in the oxygen dissolved (OD), biochemical demand of oxygen (BDO), the chemical demand of oxygen (CDO), the total solids (TS) and the sedimentable solids (SS). The results prove that the residual waters generated in the institute varied their composition in the different day hours. This is conditioned by the development of the agricultural activities as well as by the characteristics of the system that define the flow of contaminants.

Keywords: residual waters, characterization, physical and chemical indicators

In livestock exploitations, unlike other productive sectors, a lower amount of elements or compounds of high risk is used. However the volume of excreta produced is one of the main problems the sector faces (Floats *et al.*, 2000).

The agricultural effluents have high concentrations of organic substances and pounds of nitrogen, phosphorus and sulphur, which change considerably in composition and amount (Costa and Urgel, 2000 and Smith *et al.*, 2001). This creates serious difficulties when such effluents are discharged in the different receptive bodies whether in the sewage system, the treatment plants, hydric resource or soils. In Cuba, except some exceptions, the solid material tends to separate from the liquid (CITMA 2000).

The residual waters from the Institute of Animal Science (where solids and liquids are included) are generated from office buildings, laboratories, kitchen-eating place, slaughtering house as well as from animal pens; those from the pens come from an integral swine unit (that provides approximately 350 t of DM/year), an integral poultry unit (that provides approximately 260 t of DM/year) and several cattle units (that provide approximately 620 t of DM/year), besides waters from the nearby community in which 500 people live (Pérez and Cepero, 2002). The effluent from each area of the institute is incorporated later to the net of the central sewage system. Due to the diversity in the composition of the waters incorporated to the net of the central sewage system, the objective of this

work was their physical and chemical characterization at the entrance of the general treatment system.

Materials and Methods

Procedure. The sampling was made for three days to obtain the higher amount of data on the characteristics of the water. Samples of 1.5 L were collected at the entrance of the Treatment Plant from 10:00 a.m. to 6:00 p.m. to cover the extreme hours of the working day (with a frequency of 2 h). In every hour, an aliquot of 250 mL of the samples was taken to form the integral sample.

Analytical determinations. *In situ* measurements of electric conductivity (Ce), oxygen dissolved (OD) and flow (Q) were made through a multimeter model Hanna C 200. The pH was measured with a digital pH meter, model CD70, WPA. The biochemical demand of oxygen (CDO), the total solids (TS), the sedimentable solids (SS), the total fixed solids (TFS), the total volatile solids (TVS), the total nitrogen (Nt) and the total phosphorous (Pt) were analyzed according to the specifications established in Standard Methods (2000).

A completely randomized design was applied to the samples, and statistics were calculated for the integral sample.

2. Scan through the abstract and find:
 - a) the objective of the experiment
 - b) the institution where the experiment was carried out
 - c) the time of samples collection/ frequency
 - d) the results
 - e) the causes of the results obtained
3. Scan through the introduction and find
 - a) Substances generally contained in agricultural effluents
 - b) Sources of residual waters
 - c) Place where the residual waters are taken from

III. Keep on Reading

Dealing with the main part of the article

1. Read the section entitled **Materials and Methods** and find:
 - a) the topics included under this section
 - b) other materials not mentioned in the abstract or the introduction
 - c) measurements made
 - d) instruments used
2. Scan through the excerpts from the section entitled **Results and Discussion** and obtain information about:
 - a) the indicators measured
 - b) the purpose of the tables and figures presented
 - c) how the results obtained compare to the values of the Cuban norm.

Results and Discussion

During the sampling time, the pH was determined, not showing differences in time (Table 1). As expected, due to the origin of these effluents, the values were next to neutrality (Cahn *et al.*, 1997, Fernández 1998, Costa and Urgel, 2000 and Soria *et al.*, 2001).

The values of electric conductivity were only higher than those reported for urban waters (Metcalf and Eddy, 1991) and ranged from 400 and 900 $\mu\text{A}/\text{cm}$ due mainly to the salts in the excreta. However, its performance was similar to the pH, without differences in time.

The oxygen dissolved evidenced indeed differences ($P < 0.05$) when comparing the values in the different sampling hours. This variability is related to the concentration of the indicators BDO_5 and CDO in the effluent. Besides, the low values of the oxygen dissolved indicate that fast initial biodegradability of the effluent due to the presence of the organic matter and the microorganisms.

Figure 1 represents the average values of the three sampling days. It may be observed that the indicators BDO_5 and CDO were very variable ($P < 0.05$) as the day passed, which may be due to the hour of cleaning of the pens in the Integral Poultry and Swine Unit generally carried out in the morning. According to the calculations it was determined that the Integral Swine Unit provides 226kg/d of total solids and the Integral Poultry Unit, 235kg/d. This

represents 43% of the contaminant charge in terms of total solids.

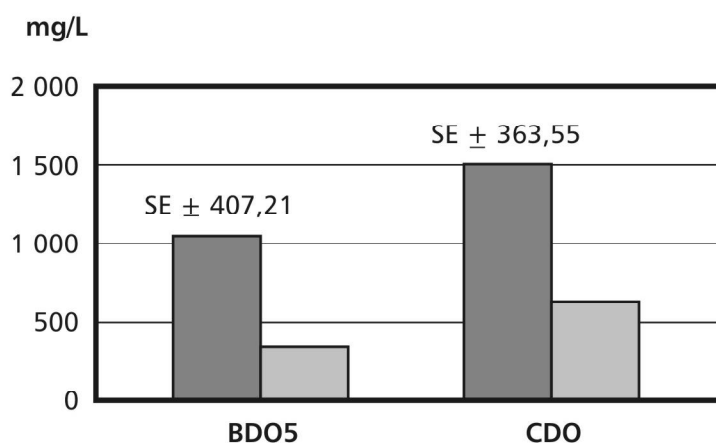
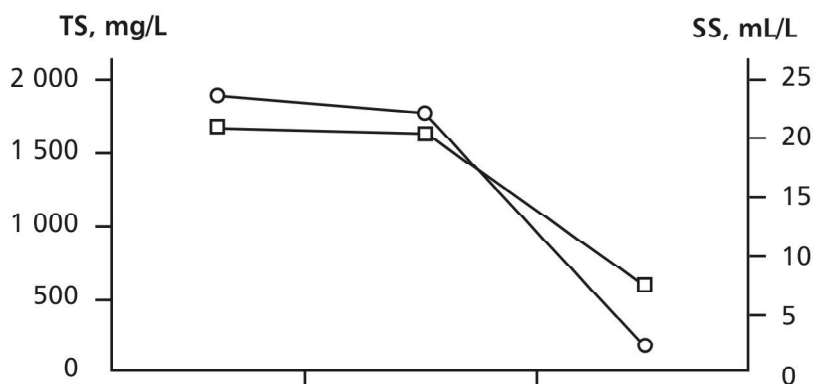
Table 2 shows the average chemical demand of oxygen in the effluent from the Institute of Animal Science, which was low compared to that obtained by other authors in livestock facilities.(...). It may also be observed that the concentrations of total and sedimentable solids were high due to the great contribution in solids of agricultural activities. (...) In regard to nutrients for nitrogen, the value obtained was higher than the report of Tilche *et al.* (1999) in swine excreta and lower than that found by Choi *et al.* (2002) in poultry excreta

Table 3 shows the values of some indicators in the analysis of the integral sample compared to those of the permissible maximum limits(PML) according to the extract of the poring norm NC27/1999 for rivers and ponds (category A), receptive body in which this water is poured. Except for the pH and the electric conductivity, the rest of the indicators surpassed greatly the values established in the Cuban norm.

The residual waters from the institute varied their composition in the different day hours, mainly as a consequence of the contribution of agricultural activities. According to the characterization of the work to fulfil the poring limits established in the legislation in force, it is necessary to design treatment systems to attain the elimination required of organic matter and nutrients.

3. Some of these figures and tables belong to the section entitled **Results and Discussion**. Scan through the text to identify and label them.

	10:00 a.m.	12:00 m	2:00 p.m.	4:00 p.m.	6:00 p.m.	SE \pm
Oxygen dissolved, mg/L	0,47 ^a	1,75 ^c	0,75 ^{ab}	1,15 ^{abc}	1,45 ^{bc}	0,23*
Electric conductivity, S/cm	1 456	757	952	814	773	184
pH	7,26	7,49	7,11	7,07	7,25	0,15



Indicator	Integral sample	PML	Reduction, %
pH	7,2	6,5-8,5	No
BDO ₅ , mg/L	335	30	91,0
CDO, mg/L	733	70	90,5
Ec, S/cm	1 100	1 400	No
SS, mL/L	10,5	1	90,5
Nt, mg/L	42,9	5	88,3
Pt, mg/L	9,17	2	78,2

Days	CDO, mg/L	BDO ₅ , mg/L	TS, mg/L	TFS, mg/L	TVS, mg/L	SS, mL/L	Nt, mg/L	Pt, mg/L	Total coniforms, NMP/100 mL H ₂ O
(1)	430	210	662	342	320	3	25,1	4,87	5,106
(2)	1 104	607	1 650	692	958	18	47,7	14,75	5,106
(3)	666	188	1 172	400	772	9	56	7,88	5,106
Average	733	335	1 161	478	683	19	43	9,17	5,106
SD	342	236	494	188	328	7	16	5,06	
CV, %	46,64	70,39	42,54	39,24	48,02	75,50	37,25	55,24	

IV. Listening and Speaking



1. Listen to Audiotext 8 and complete the chart.

Sources of Water Pollution

Sources	Characteristics
1.	<ul style="list-style-type: none"> Discharge of _____ Burning of _____ by power plants, _____ and _____ releases _____ and _____ oxides into the air. Use of water to _____ equipment. Then the hot water is _____ into rivers and lakes.
2. Sewage	<ul style="list-style-type: none"> _____ wastes, garbage and _____ used for washing and cleaning. Some sewage goes _____ to the waterways or oceans
3.	<ul style="list-style-type: none"> Water from _____ or melted snow flows from _____ into streams carrying _____ fertilizers and _____ that farmers have used on the land. _____. Water used for _____ may be polluted by _____, agricultural pesticides and _____ chemicals on the soil surface before it flows back into the ground.

2. What is the relationship between the listening passage and the article? (You may be asked to talk about this during the practice session).

V. Writing

Write a key point summary of the article. Focus on the main points discussed in each section.

SECTION 2

Social Studies

The Ripe Fruit Syndrome



Objectives: In this unit you will become better acquainted with the structure of an article and the elements that authors use to provide readers with clues to anticipate and understand ideas expressed in the article. Exercises have been built around the article entitled **The Ripe Fruit Syndrome*** to help you better understand the vocabulary used and the main points discussed by the author. In addition you will find activities to further develop your listening, speaking and writing skills.

* Written by Manuel E. Yepe. Cuban lawyer, economist and social scientist. At present he is also adjunct Associate Professor of the Raúl Roa Higher Institute of International Relations in Havana.

I. Before You Start Reading



1. Listen to Audiotext 1 with related information about the topic you are going to deal with in this unit. Listen to the audiotext again and fill in the blanks with the missing words of Martí's and Maceo's quotations mentioned in the audiotext. Then write down the original quotations in Spanish.

"I _____ inside the _____ and I know its _____ and my _____ is the slingshot of _____". José Martí.

"It is _____ to rise or fall _____ than to contract debts of _____ to a _____ so _____". Antonio Maceo.

2. In 1823, President James Monroe pronounced what became known as the Monroe Doctrine or the "America for the Americans" doctrine. What restrictive use of the word **Americans** can be inferred from this statement? Write down your opinion in 20-25 words.
3. Bear in mind

The Structure of an Article

The structure of an article is similar to the structure of a paragraph: a topic sentence, development sentences, and sometimes, a clincher sentence. An article usually begins with a paragraph that anticipates what the article is about. After this come supporting paragraphs that give additional information. The article ends with one paragraph or more with a summary of the article, some conclusions and perhaps a clincher sentence.

II. Begin Reading

A. Dealing with the Structure of the Article

In Paragraph 1 the author anticipates **the main idea** he is going to deal with: **Annexation of Cuba has always been in the interests of the USA.**

1. Scan through the text and write down the paragraph number or numbers which contain the following **supporting ideas** and **details**.
 - a) the history of US intentions in the late 18th century
 - b) a timely warning against US appetites
 - c) a reference to the "ripe fruit premise"
 - d) a concrete example of the "manifest destiny"
 - e) The Pre-1898 history of US intentions
2. Find the definition of the "manifest destiny". In not more than 25 words write down what this "US destiny" is all about.
3. Find a metaphor used to describe what would happen to Cuba when finally separated from Spain. Write down the translation of this metaphor into Spanish.
4. Find the personality traits attributed to Cubans by J. C. Breckenridge. Based on this information and in not more than 25-30 words, make a description of "the Cuban character". Begin with: **According to J.C. Breckenridge...**
5. Find information to answer the following questions. (In 40-60 words write your answers. You may be asked to talk about this in the practice session with your classmates and your language teacher).
 - a) What evidence does the author give to support the idea that since the 18th century US administration was interested in preventing Cuba's independence?
 - b) What doctrine proclaimed in the USA in the 19th century is still used by US administrations in the 21st century?
 - c) What similarities can you find between what Breckenridge said in 1897 and present-day US policies around the world?

B. Expand your vocabulary

Find the English equivalent to:

- a) *evitar* _____
- b) *dominio español* _____
- c) *dentro de* _____
- d) *hacia el oeste* _____
- e) *autóctona* _____
- f) *exterminada* _____
- g) *contundente* _____

- h) *arrancar de su seno* _____
- i) *habitantes* _____
- j) *cañón* _____
- k) *la Perla de las Antillas* _____

The Ripe Fruit Syndrome

MANUEL E. YEPE

1.

Two precepts have conditioned US foreign policies towards Cuba at the highest levels of government since the end of the 18th century: “the manifest destiny doctrine” and “the ripe fruit premise.” In 1783, John Adams –the second US president– declared that the island of Cuba was a natural extension of the North American continent, and that its annexation was absolutely necessary for the United States. He maintained that Cuban independence was never to be allowed and that the best way to avoid its independence was to let Cuba remain under Spanish rule until the island could be absorbed by the US.

2.

The “manifest destiny” was a concept developed in those days as a doctrine attributing to the US an alleged special mission: to propagate its particular form of economic, social and political organization; first within North America and later throughout the Western Hemisphere. The westward expansion was completed by the end of the 19th century: the indigenous population was annihilated and its Mexican neighbors lost nearly half their territory (Texas, New Mexico, and California).

3.

In 1823, President James Monroe pronounced what became known as the Monroe Doctrine or the “America for the Americans” doctrine, stating that interference by any European power in the newly emerging Latin American republics would be considered an unfriendly act against the US itself and, therefore, the US had the right to “protect” the region. This apparent US defensive paternalism

towards the rest of the hemisphere very soon became forceful expansionism.

4.

Some years before, John Quincy Adams, the Secretary of State in Monroe’s administration and his successor as president, had written: “...if an apple, severed by the tempest from its native tree, cannot but fall to the ground, Cuba, forcibly disjoined from its unnatural connection with Spain and incapable of self-support, can gravitate only to the North American union, which by the same law of nature, cannot cast her off from its bosom.” This principle, however, was not obstacle for the US trying to buy Cuba from Spain. An offer to purchase the island for \$100 million was refused by the Iberian crown. By the 1880s, US capital was heavily involved in the Cuban economy, particularly in the sugar industry, as a result of the global interest in turning the Caribbean islands into sugar-based economies.

5.

The revolutionary origins of the US were still alive in the American people’s memory and many ordinary US citizens were very sympathetic to Cuba. This fact overlapped a tense build –up in the US for a direct military intervention in Cuba’s independence war against Spain. However, in 1895, shortly before being killed in combat, José Martí drew the attention to the fact that, while fighting Spain, he also wanted “to prevent the United States, with the independence of Cuba, from extending itself through the West Indies and falling with added weight upon our lands of America. Everything that I have done is for that purpose”, he declared.

6.

On December 24th 1897, J. C. Breckenridge, then US Under-Secretary of War, wrote in a memorandum: “This (the Cuban) population is made up of whites, blacks, Asians and people who are a mixture of these races. The inhabitants are generally indolent and apathetic. Since they only possess a vague notion of what is right and wrong, they tend to seek pleasure not through work, but through violence. It is obvious that the immediate annexation of these disturbing elements in our federation in such large number would be madness, so before we do that we must clean up the country. We must destroy everything within our cannons range of fire. We must impose a harsh blockade so that the hunger and its constant companion, disease, undermine the peaceful population and decimate the army. The allied army must be constantly engaged in reconnaissance and

vanguard so that the Cuban army is irreparably caught between two fronts”.

7.

The high US official went on to explain the plan for the military occupation of Cuba and the temporary maintenance by force of the new independent government, made up of a minority of the autonomists and Spaniards who still remained, until that government was strong enough to maintain itself against separatists. “When this moment arrives, –he concluded– we must create conflicts for the independent government. The government will be faced with these difficulties. These difficulties must coincide with the unrest and violence among the aforementioned elements to whom we must give our backing. To sum up, our policy must always be to support the weaker against the stronger, until we have obtained the extermination of them both, in order to annex the Pearl of the Antilles”.

III. Keep on Reading

A. Dealing with the Structure of the Article

1. Scan through the text and write down the paragraph number which contains the following supporting ideas and details
 - a) Conclusions
 - b) Post 1898 and the first years of the neo-colonial republic
 - c) The year 1898
 - d) Post 1959
2. Find information to answer the following questions (In 40-60 words write your answers to each question. You may be asked to talk about this in the practice session with your classmates and your language teacher).
 - a) What statement made by President McKinley showed his real intentions towards Cuba?
 - b) In addition to being a military base, what else has Guantánamo base become lately?
3. Find the last sentence used by the author to end up his article. It is used as a **clincher sentence**, i.e a sentence that gives in a **nutshell** (*en pocas palabras*) the main idea discussed throughout the article. Translate this sentence into Spanish.

B. Expand your vocabulary.

Find the English equivalent to:

- a) *condición* _____
 b) *reuniones* _____
 c) *excepto una guerra abierta* _____

8.

Early in 1898, the battleship USS Maine arrived in Havana on a “courtesy visit”. In the morning February 15th, it exploded and 260 of the crewmembers were killed. (...) On April 11th 1898, President McKinley requested authorization from the US Congress and Senate to intervene, and a few days later declared war on Spain. The US had never recognized the Cuban people’s struggle for independence or their liberation army as a legitimate force. Just a few hours after declaring war on Spain, McKinley said he would not recognize the Republic of Cuba as declared by the revolutionary Government in Arms. It was obvious that he only wanted to drive Spain out and gain sole influence for the US. In just eight months, Cuba saw US military intervention, the defeat of Spain, actions by the US forces against the Cuban independence army and the imposition of a transitional government –a US military governorship. More than thirty years of patriotic struggle for independence had served for nothing.

9.

(...) On December 10, 1898 the Treaty of Paris was signed. The US treated Cuba like a conquered country and got Spain to hand over the island to their military occupation; Cuban representatives were excluded from the proceedings. The Cuban people angrily opposed annexation, but in March 1901, the US Congress attached an amendment to the Cuban Constitutional project imposing, as a proviso for the US to leave the government of the island in Cuban hands, those conditions contained in what became known as the Platt Amendment.

10.

(...) Theodore Roosevelt was president of the United States from 1901 to 1909. Invasions, threats

and treaties made at gunpoint characterized Roosevelt’s term as president. On May 20, 1902 the Republic of Cuba was officially established, but to say that Cuba became independent that day is to disguise the historical truth and to twist the role played by the USA in the outcome of Cuba’s war of independence against Spanish colonialism. (...) By 1902, time had come for the first elections to be called. Tomas Estrada Palma, the elected president, was a Cuban who had become a naturalized American citizen after living in the United States for 25 years and who favored the annexation of Cuba to the US. In July 1903, a so-called Permanent Treaty was signed, which involved, among other “generous” Cuban concessions to the US, the unlimited lease of a territory in the bay of Guantánamo.

11.

(...) One hundred years later a terror prison camp for the abuse and torture of detainees under US custody was established in Guantánamo in defiance of international humanitarian law, and is still existent despite almost unanimous universal disapproval. The US naval base at Guantánamo has also been the place from which the US has launched many invasions on other countries in the region, such as the invasions on the Dominican Republic, Grenada, Panama and Haiti, just to mention a few.

12.

(...) After six decades of submission to US hegemony, first as an occupied country and then as a semi-colony under US control and supervision, the Cuban people defeated Batista’s dictatorship, which was notorious for its corruption and repression and which had full support of the US military advisors in every arm and branch. Since the triumph of the Revolution on January 1st, 1959,

ten US administrations have used every means at their disposal, short of all-out war, to strangle the Revolution. The economic blockade, euphemistically called embargo in the US, which has been exercised against Cuba for 48 consecutive years has had an estimated cost of 125 billion US dollars. As those

who manipulate and control the media on a global scale happen to be the same interests served by the policy-makers and strategists that generate these deceptive US actions against Cuba, world public opinion must remain aware of such ripe fruit appetites.

IV. Writing



1. In 60-80 words write down why the Platt Amendment prevented Cuba from becoming a truly independent and sovereign republic in 1902. Listen to Audiotext 2 to collect the information you need to write your paragraph and to practice the pronunciation of words and expressions. (You may be asked to read your paragraph aloud during the practice session).
2. Using the information provided by the author in this article, write down, in 150-175 words, a summary of US appetites concerning Cuba since the 18th century to date.

One Hundred Hours with Fidel



Objectives: In this unit you will recall and practice the use of direct and indirect (or reported) speech. Exercises have been built around selected excerpts of Chapter 24 from the book **One Hundred Hours with Fidel** by Ignacio Ramonet (2006), to help you better understand the vocabulary and the main points discussed. In addition you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

1. The following statement gives you a foretaste (*anticipo*) of the text you will be reading.

Fostered and financed by the CIA, fascist coups d' état plagued the world of the 20th century and that of the 21st to date.

coups d' état = *golpes de estado*



2. Listen to Audiotext 3 with more information about the topic and material you are going to deal with in this unit. Then listen to it again to fill in the blanks with the missing words.

Fidel, turned into a sort of _____, receiving and _____ news and public _____, is an exceptional witness to the formidable counter-coup given by the people and the _____ of Venezuela that led to the reinstatement of the _____, Hugo Chávez Frías, after the _____ coup d'etat of April 11, _____.

Chapter 24 from the book **One _____ Hours with Fidel**, is a _____ and truthful _____ of these events. It is also an _____ to other transcendental _____ in Latin America, such as: the _____ of the indigenous peoples, the _____ tradition among Latin America _____; the ill-fated _____; a profile of _____ of the present and the _____ of _____ America; the _____ of neoliberalism and the certainty that _____ is possible.

3. In the audiotext the acronym FTAA is used. What does this acronym stand for?
4. Collect information about two coups d'etat that took place in our Latin American region (one in 1952 and the other one in 1973). Share your information with a partner. (You may be asked to talk about this in the practice session with your classmates and your language teacher).

5. Bear in mind

The Interview

An **interview** is a meeting where a person (the interviewee) is asked questions by one or more persons (the interviewer(s)). The questions are asked to find out about the interviewee's personal activities, viewpoints, plans, etcetera. The role played by each party is important for the success of an interview: the interviewer has to ask interesting and relevant questions, and the interviewee is expected to give honest and coherent answers. The use of direct speech –using the same words, repeating exactly what someone else (or oneself) said before– generally gives more credibility and emotion to the testimony collected during the interview. Quotations, therefore, have to be accurate and exact.

Notes:**interview** = *entrevista***interviewee** = *entrevistado(a)***interviewer** = *entrevistador(a)***direct speech** = *estilo directo***quotation** = *cita***accurate** = *preciso(a)***II. Begin Reading**

Here is one of the questions made by journalist and writer Ignacio Ramonet to Commander-in-Chief Fidel Castro Ruz.

IGNACIO RAMONET: On April 11, 2002 a coup d'état against Chávez was staged in Caracas. Did you follow these events?

FIDEL CASTRO: (...) When, at midday on April 11, we saw that the protests called by the opposition had been diverted by those taking part in the coup and were approaching Miraflores. I realized straightaway that something serious was about to happen. (...) (...) I began to try to get in touch with the Venezuelan president early in the afternoon. It was impossible! After midnight, at 12:38 am on April 12, I was informed that Chávez was calling.

(...) In the most persuasive tone that I could muster I said: "Prepare the ground for an honorable and dignified agreement, and preserve the lives of the men that you have, who are men

of great loyalty. Don't sacrifice them and don't sacrifice yourself."

"They are all prepared to die here", he (President Chávez) replied with emotion.

In a heartbeat I replied: "Yes, I know, but I think that right now I can think more clearly than you. Don't resign, demand honorable and secure conditions so as to ensure that you're not betrayed, because I think your life should be preserved. Also, you have a duty to your comrades. Don't sacrifice yourself".

I was aware of the difference between Allende's situation on September 11, 1973 and Chávez's situation on April 12, 2002. Allende didn't have one single soldier. Chavez had a large following among troops and army officers, the youngest especially. "Don't abdicate! Don't resign!" I repeated.

We discussed other matters: how I thought that he should leave the country provisionally, get in touch with an officer with real authority over the putschists, explain that he was prepared to leave the country, but not to surrender. From Cuba we would try to mobilize the Diplomatic Corps in our country and in Venezuela, and send over two planes with our Foreign Minister and a group of diplomats to fetch him. He thought about it for a moment and finally accepted my proposal. Now it all depended on the military leader of the enemy forces.

I.R.: (...) You were encouraging him to take up arms in resistance?

F.C.: No, quite the opposite is true. This was what Allende did, which in my opinion was the right thing to do in those circumstances, and he paid heroically with his life, as he had promised he would.

Chávez had three options. First, he could entrench himself in Miraflores and hold out until the very end. Secondly, he could leave the Palace and try to join the people in an attempt to spark a national uprising—something which didn't look too promising given the circumstances. Or, thirdly, he could leave the country without abdicating or resigning so that later he could resume the struggle with a real chance of rapid success. We suggested the third option.

My final words of persuasion during the telephone conversation were basically: "Save those brave men who are with you in this unnecessary battle now". I said this because I was convinced that a leader as popular and charismatic as Chávez, who had been overthrown and betrayed like that, if they didn't kill him, the people—in this case with the support of the cream of the Armed Forces—would demand his return with greater force and he would have to be brought back. This is why I took the responsibility of making that proposal.

At that very moment, when there was a real possibility of a speedy and victorious return, there was no need to die in battle, as Salvador Allende had rightly done. And Chávez did indeed return

victorious, although much earlier than I could have anticipated. (...)

.

(...) We proposed sending over two planes to fetch him in the event that the putschists decided to let him leave. However, the leading military putschist rejected this plan (...)

(...) Chávez had been taken prisoner by the putschists and all communication with him had been lost. (...)

(...) I spoke to Lucas Rincón (Inspector General of the Armed Forces). He confirmed that the paratrooper brigade, the armored division and the F-16 fighter-bomber base opposed the coup and were ready for action. I went as far as to say that he should do everything possible to resolve the matter without resorting to military combat. (...)

(...) General Vázquez Velasco, who proclaimed himself "Commander-in-Chief" of the Venezuelan Armed Forces during the coup d'état, answered the call. He confirmed that he had Chávez and assured that he would not be killed, but Vázquez Velasco said that he could not agree to the requests made of him. (...)

(...) For the rest of the day, until midnight on the 13th, I spent my time talking to as many people as possible about the question of Chávez's life. I spoke to many people, because that afternoon the masses, with the help from many army officers and troops were gaining control of everything. (...)

(...) It was only when all the details of Hugo Chávez's ordeal came to light—starting with the time that the putschists took him to an undisclosed destination on the night of the 12th—that we realized what incredible danger he had been in. This was a situation in which he had to bear all his brainpower, his serenity, his sangfroid and revolutionary instinct. What was more astonishing was the fact that up until the very last minute the putschists had kept him in the dark so as to what was happening in the country and insisted until the very end that he sign a letter of resignation. He never signed it. (...)

B. Expand your vocabulary. Scan through the text and ...

1. Find the English equivalent to...

- a) *lealtad* _____
- b) *ser traicionado* _____
- c) *golpistas* _____
- d) *reanudar* _____
- e) *valiente* _____
- f) *desencadenar* _____
- g) *cazabombardero* _____
- h) *experiencia terrible* _____
- i) *inteligencia* _____
- j) *sangre fría* _____

2. Find four time expressions related to a period in the day

- a) _____
- b) _____
- c) _____
- d) _____

3. Find information to answer the following questions. (Prepare yourself to give a spoken report of 40 seconds for each question).

- a) In what ways was the situation faced by President Allende in 1973 different from the situation faced by President Chávez in 2002?
- b) How was the Cuban Government planning to help President Chávez leave Venezuela safe and sound?*
- c) Which of the three options was taken? Explain.
- d) Why were the putschists forced to free President Chávez?

Note:

safe and sound = *sano y salvo*

III. Keep on Reading

1. Read another of the questions asked by Ramonet to Commander-in-Chief Fidel Castro Ruz

I.R.: (...) Chávez is a representative of the progressive military, but in Europe and also in Latin America, many from the progressive movement criticize him precisely because he

is a military man. What is your opinion on this obvious contradiction between progressive ideas and the military?

F.C.: Omar Torrijos in Panama was an example of a military man with a profound awareness of social justice and patriotism. In Peru, Juan Velasco Alvarado⁸ was responsible for considerable progress. It should also be recalled, that among the Brazilians, Luis Carlos Prestes, for example, was a revolutionary officer who led a heroic march between 1924 and 1926, which was almost identical to that led by Mao Zedong between 1934 and 1935.

Jorge Amado⁹ wrote about the march led by Prestes in a beautiful story entitled *El caballero de la esperanza*, one of his magnificent novels. That military deed was impressive; for more than two and a half years he travelled extensive regions of his country never suffering a defeat. This recent 20th century saw important revolutionary exploits led by military men.

In this context, we could mention the names of illustrious military men such as Lázaro Cárdenas, a General in the Mexican revolution who nationalized the oil industry, carried out agrarian reforms and won the eternal support of the people.

Some of the first to raise up arms in Central America in the 20th century was a group of Guatemalan officers who, led by Jacobo Árbenz, a senior officer with the Guatemalan Army, took part in historic revolutionary deeds in the 1950s, including the noble and brave agrarian reform. This reform led to a mercenary invasion which imperialist forces launched, as in Bay of Pigs, against that government legitimately defined as progressive.

There are numerous examples of progressive military men. Juan Domingo Perón, in Argentina, also began in the military. In 1943 he was appointed Minister of Labor. In that office, he passed laws that benefited the workers, who rewarded his actions by rescuing him when he was taken prisoner.

Perón made some mistakes: he offended the Argentinian oligarchy, he humiliated them. He

nationalized the theatre and other symbols of the upper classes, but their political and economic power remained intact. At the opportune moment the oligarchy overthrew him with the complicity and support of the United States. Peron's greatness lay in the fact that he called upon all the reserves and resources of that rich country and did all that he could to improve the living conditions of the workers. The working class, forever grateful and loyal, made Perón into a life-long idol of the humble people.

General Liber Seregni, who was the President of Uruguay's Frente Amplio party until a few years ago, is one of the most progressive and respected leaders that Latin America has known. His integrity, his decency, his firmness and tenacity contributed to the victory of that noble people, who elected Tabaré Vázquez, Seregni's successor, President of the Eastern Republic of Uruguay, and placed the Uruguayan Left in power, at a time when the country was on the edge of a precipice. Cuba is thankful to Liber Seregni for the solid foundations that he and other eminent Uruguayans laid down to establish the fraternal relations of solidarity that currently exist between Uruguay and Cuba.

And, we cannot forget Francisco Caamaño, a young Dominican military man who, for months, heroically fought against the 40 000 US troops that landed in the Dominican Republic in 1965, sent by President Johnson, to prevent the return of Constitutional President Juan Bosch. His tenacious month-long fight against the invaders, as the leader of a handful of soldiers and civilians, is one of the most glorious revolutionary episodes in the history of this hemisphere. Caamaño, following a truce he forced the empire to accept, returned to his homeland and devoted his life to the struggle to liberate his people.

In the absence of a man like Hugo Chávez, a man of humble origins who was trained in a Venezuelan military academy, where so many ideas about freedom, unity and Latin American integration were sown by Bolívar, there would not have emerged

today, at this decisive moment for our America, a process as historically and internationally important as the revolutionary process that is underway in this sister nation today. I see no contradiction there.

Notes:

⁸ Juan Velasco Alvarado (1910-1977), a General and leader of a military junta, took power in Peru and was President from 1968 to 1975. He nationalized the country's bank, the petroleum, fishing and copper industries (of strategic importance to the nation) and undertook an important agrarian reform.

⁹ Jorge Amado (1912-2001), great Brazilian writer, author of a biography of Luis Carlos Prestes published in 1942, *Prestes, el caballero de la esperanza*. Futuro Publishing House, Buenos Aires, 1958.

2. Scan through the text to find information to answer the following questions (You may be asked to talk about this in the practice session with your classmates and your language teacher).

- a) What progressive action was undertaken alike by President Velasco Alvarado in Peru, President Lázaro Cárdenas in México and President Jacobo Arbenz in Guatemala during their mandates?
- b) What examples are given which show overt or hidden manoeuvres of the USA to put an end with progressive Latin American governments?
- c) What was, according to Commander-in-Chief Fidel Castro, Peron's biggest mistake?
- d) What was the link between Seregni and Tabaré Vázquez?

IV. Writing

Several direct quotes are used in the texts so as to give more emotion to the narration. Report on some parts of the conversation between Commander-in-Chief Fidel Castro and President Hugo Chávez. Do not use quotations. Change what they said from **direct speech** into **indirect or reported speech**. Remember to make the necessary changes concerning verb tenses, personal pronouns, demonstrative (**this/that these/those**) and possessive adjectives (**my, your**, etc.), and the adverbs **now** and **here**.

Examples:

Direct speech: **María said: "I will leave on Friday".**

Reported speech: **María said she would leave on Friday.**

Direct speech: **María told me: "I want your opinion here and now!"**

Reported speech: **María told me that she wanted my opinion there and then.**

Here are excerpts of some of the quotations you will use in your report.

Fidel told Chávez: "Prepare the ground for an honorable and dignified agreement, and preserve the lives of the men that you have(...). Don't sacrifice them and don't sacrifice yourself".

"They are all prepared to die here", **Chávez replied with emotion.**

Fidel in a heartbeat replied: (...) "Yes, I know but I think that right now I can think more clearly than you"(...).

Fidel said to Chávez: ...“Don’t resign, demand honorable and secure conditions so as to ensure that you’re not betrayed, because I think your life should be preserved...”

Begin your report like this:

Over the phone, Commander-in-Chief Fidel Castro very tactfully gave some ideas and pieces of advice to President Chavez in the early hours on April 12. In that crucial conversation they both evaluated the situation. Here is a report of some of the things that were said by these two outstanding revolutionary leaders.

Continue you report in the following manner: (The first one has been done for you)

Fidel told Chávez to prepare the ground for an honorable and dignified agreement, and to preserve the lives of the men that he (Chávez) had. Fidel also told Chávez not to sacrifice them and not to sacrifice himself”. With emotion President Chávez...

In a heartbeat Fidel ...

Fidel recommended ...

Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women.

Introduction (Part I)



Objectives: In this unit you will become acquainted with the format of an article based on a report of a case study, particularly with the type of information included in the Introduction and the way authors refer to the samples, methods, and statistics used in their studies. Several exercises have been built around each selected excerpt of the article **Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women** to help you better understand the author's main points and the vocabulary. In addition, you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

1. From the title **Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women**, anticipate at least three ideas you expect to find in this article. Jot them down in your notebook.
2. Listen to Audiotext 4 to get information about the author and about the article. While listening, complete the following card:



Full name: Marta Núñez-Sarmiento

Occupation: _____

Academic rank: _____

Institution: _____

Nationality: _____

Subject: The role and attitudes of _____ and _____ trained women during the _____.

Source of information: macroeconomic _____ and women's own _____.

Journal: _____

Volume: ____ Number: ____ Date: _____

Place of publication: _____

3. Bear in mind

The Case Study

A **case study** is a detailed account giving information about the development of a person, group, or thing, especially in order to show general principles. The case study is one of the several ways of doing social science research. It is the strategy generally preferred when «how» or «why» questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon with real-life context.

II. Begin Reading

1. Read the **Introduction** and compare the ideas you anticipated to the information provided by the author concerning the content of her article. How good was your prediction?

Cuban Strategies for Women's Employment in the 1990s: A Case Study of Professional Women

MARTA NÚÑEZ-SARMIENTO

Introduction

A. This article summarizes the results of a case study I recently concluded with women professionals and technicians in Cuba during the crisis of the 1990s; it is part of a larger study on Cuban women and employment. I intend to argue that the process of women's incorporation and retention in the labor force in Cuba did not stop during the crisis years of the 90s, nor did all the changes in gender ideology that women's employment has promoted during the last forty years come to an end. The article is a contribution to the analysis of certain aspects of the alternative project to neoliberalism that the Cuban government developed during these crisis years in order to maintain basic socialist achievements.

B. I have also used my findings from several case studies with Cuban working women in traditional and non-traditional women's jobs, as well as from wider research on women and employment in Cuba that I carried out from 1985 to 1998. I decided to use these findings in order to explain the high participation of women among Cuban

professionals and technicians for more than 20 years, and the high proportion of this category in the total number of employed women, a trend that began around 1978. I have grouped my arguments in two parts. The first deals with "macro information". As this aspect is fairly well known, I have presented it quite briefly. I devote more attention to the second part, which is based on a case study I did at the end of 1999 and the beginning of 2000 among 18 women professionals and technicians living in Havana. Since my purpose in doing this research was to define certain aspects of these women's gender ideology, I posed the following questions to them:

1. What strategies did you work out during the 90s to keep your jobs and maintain the everyday lives of your families?
2. How has your professional status influenced your abilities in decision-making? Do you feel capable of working as a manager? Have you ever occupied such a position? Do you wish to work as a manager?

3. Do you believe that the way women's employment has developed in Cuba, especially among women professionals and technicians, has affected men's attitudes?
4. What has your status as a professional or technician meant for you in your personal lives? How has it influenced your relations with your husband or companion, with your parents and children, and with your colleagues at work?
2. Read the **Introduction** again. Decide whether the following statements are true (T) or false (F) in relation to the information provided in this section of the text. If you think a statement is false, change it to make it true. (You may be asked to talk about this in the practice session with your classmates and your language teacher).
- _____ This article reports an independent study.
 - _____ The author believes that despite difficulties and limitations during the special period, Cuban women continued to actively participate in the labor force.
 - _____ The author has been working on women's studies for more than one decade.
 - _____ The case study was conducted nationwide.
 - _____ The author uses in her arguments both official information and the opinions and beliefs of 18 women professionals and technicians.
3. Expand your vocabulary
- Scan through the **Introduction** and find the English equivalent to:
- estudio de caso* _____
 - fuerza laboral* _____
 - resultados (de investigación), hallazgos* _____
 - tendencia* _____
 - ideología de género* _____
 - toma de decisiones* _____

III. Keep on Reading

1. Scan through the excerpt **Sample and Methods**. This excerpt provides information about the sample used in this case study. Tick (✓) next to the information which has been included.

Sample and Methods	
___ marital status	___ political affiliation
___ religion	___ salary earned
___ size of the sample	___ municipality
___ skin color	___ sexual orientation
___ age	___ education

Sample and Methods

C. The 18 women professionals and technicians in my sample ranged from 28 to 66 years of age. All of them studied for their careers or graduated from their programs after 1959, and started working during the Revolution. Fifteen are professionals in medicine, dentistry, economics, architecture, computer sciences, pedagogy, languages, scientific and technological information, sociology, civil engineering, and music. Among the three technicians one works in dentistry, another manages a laundry, and the third is an executive secretary. Nine are white, five black, and four mixed.

D. Ten are divorcées, separated or widows, six are married, and two are single. Fourteen have children. They averaged 27 years of age when they had their first child. Their average salary is 328 pesos, higher than Cuban workers' average salary (as of 1999), which is 207 pesos.

E. During the 90s, all fourteen women with children had to take care of their aging parents and other elderly members of their families. Eleven had

working mothers, while the mothers of the other seven were housewives.

F. I do not know how all Cuban women professionals and technicians are distributed among social and demographic categories. Nor can I say how representative they are in relation to their colleagues in Havana or in all of Cuba. Therefore I am unable at this point to generalize on the basis of my findings. Another limiting factor is that I selected these 18 women because they know me. This removed the problem of gaining their confidence as we embarked on lengthy interviews.

G. I used two methods in this study: in-depth interviews and analysis of statistical data, and other documentary information culled from statistical yearbooks, laws and resolutions related to Cuban social policies concerning women, documents elaborated by the Federation of Cuban Women, and studies dealing with gender relations in Cuba written by Cuban researchers and by colleagues from other countries

2. Scan through the next excerpt entitled **Some Useful Statistics** in order to find the information you need to underline the correct word/expression in each sentence.

- a) The proportion of women in the total labor force in the period between 1970 and 1989 (significantly increased-slightly increased)
- b) In 1997 (more-fewer) women worked in the state sector.
- c) The percentage of women in the cooperative sector (rose-decreased) in 1997.
- d) The trend of higher percentages of women professionals and technicians in the total Cuban labor force (stopped abruptly-continued) during the special period.
- e) There are (more- fewer) men than women in the educational sector, public health, sports, and tourism.
- f) In 1994, (more-less) than half the district attorneys in Cuba were women.

Some Useful Statistics

H. The proportion of women in the total Cuban labor force increased in a stable manner from 1959 (13%) to 1970 (19%). Between 1970 and 1989 this index kept increasing steadily, and was more accentuated than in the previous eleven years: from 19% in 1970 it rose to 38.7% in 1989. It also increased in absolute figures. From 1989 to 1996 this trend stopped: the rates of women's participation in the labor force oscillated, and they were relatively lower in other estimates. In 1989 the representation was 35.5%, while in 1995 and 1996 it was 35.1 %. The indexes that showed a slight increase were those of women in the state civil sector, 41.3% in 1989 and 42.3% in 1997.

I. During the 1990s Cuban society underwent the "special period" that resulted from severe economic shortages due to the crumbling of the socialist countries and the reinforcement of the US blockade against Cuba. There was a decline in all spheres of society, which necessitated structural readjustments that continue to this day. Women were compelled to readapt to new forms of employment. At the outset of the "special period", almost the entire female labor force belonged to the state civil sector. Many women changed their job orientation after the economic restructuring that began in earnest around 1995, which, among other things, either opened or widened other non-state sectors. Thus, in the private sector, women's participation in the labor force increased from 15.1 % in 1989 to 22.9% in 1997. According to data from the Ministry of Labor, of all women workers in 1989, 89% worked in the state sector, while in 1997 the figure decreased to 81.3%. In 1989, 0.8% of women workers were employed in the cooperative sector, in 1997 it was 5.2%. The so-called joint-venture sector did not exist in 1989; in 1997 2.5% of women workers were employed in this new sector.

J. These statistics justify a positive understanding of women's adaptation to the process of redimensioning of employment in the sense that

they flexibly repositioned themselves in the job structure.

K. Since 1977 women represent more than half of Cuban professions and technicians, a trend that rose to 66% in 1999. Beginning in 1978, the category of professionals and technicians included the majority of women workers, a trend that did not cease during the crisis years of the 1990s. Let me try to explain the reasons for this.

L. There has been a process of feminization in the field of education, especially at the high school and university level. The *Statistical Profile of Cuban Women on the Threshold of the 21st Century*, published by the National Office of Statistics, states that "at the junior high and high school levels, more and more girls per 100 boys are enrolling, up to a point where at the latter level, they doubled the boys... Beginning in the 80s, a large increase in the number of women in higher education took place: in 1996-1997 women represented 60% of total enrolment at this level".

M. Women have attained higher education levels than men, for example, in 1978 4.9% graduated from universities, compared to 3.5% of men. In 1996, 44.95% of all women workers had graduated from high school, compared to 32.2% of men workers. They are employed in all economic spheres, in both traditional and non-traditional jobs. In 1996, 71% of women workers were highly concentrated in education, industry, public health, sports, tourism, and trade. The rest were in construction, agriculture, transportation, communications and several others. Women's participation is higher in education (61.5%), in public health, sports and tourism (62.1%), and in finance and insurance (60, 7%). In fields traditionally associated with men, women represent 19% of workers in the sugar industry, and 21% in agriculture. We should note as well that in 1994, 55.4% of district attorneys were women, as were 47% of members of the Supreme Court, 51% of Cuban physicians, and 45% of scientists.

3. Scan through the next excerpt entitled **Cuban Legislation Affecting Women** in order to answer the following questions:

- a) In your opinion, are all the eleven actions mentioned by the author in paragraph O always effective in Cuban society at present? Work with a partner and analyze each action one by one. Do some of these actions need more legal/ moral support? Why?
- b) The author mentions four points to explain why women stayed at their jobs throughout the years of crisis and readjustment. Do you agree with these points? Why or why not?

4. Expand your vocabulary

Scan through paragraph P to locate each of the word groups in Column A. Use context clues to help you determine the correct equivalent in Spanish in Column B.

Column A	Column B
a) bread winner	___ <i>mundo del trabajo</i>
b) wage-earners	___ <i>sostén económico</i>
c) sustained economic growth	___ <i>estrategia de desarrollo</i>
d) development strategy	___ <i>crecimiento económico sostenido</i>
e) work world	___ <i>asalariado/a</i>

5. Read paragraph Q, and then answer the following questions. (You may be asked to talk about this in the practice session with your classmates and your language teacher).

- a) Although the Cuban Constitution establishes equal pay for equal job, Cuban women earn less money than men. Why?
- b) Why is it controversial or inconsistent that only 31% of managerial posts are held by women?

Cuban Legislation Affecting Women

N. In order to understand these trends in women's employment, we have to consider the social policies aimed at eliminating all forms of discrimination against women and also the legal framework and specific measures resulting from these policies. They have been enacted since the 60s, and have been subject to constant modification in accordance with the unfolding conditions and needs of Cuban women and of Cuban society as a

whole. Although all institutions have participated in this process at various levels, the Federation of Cuban Women has acted as a sort of consciousness-raising agency in favor of women, since it was founded in 1960.

O. I will mention eleven different actions during the past 40 years that have benefited women, including professionals and technicians. During the

90s none was abolished, but some were readjusted to fit the new circumstances.

1. The Maternity Law of 1974, included in the Labor Code, regulates maternity leaves for working women. It was modified in 1993 in order to extend the length of time given to mothers to look after their newly born children.
2. The Family Code of 1975.
3. Since 1961, free education from kindergarten to postgraduate levels.
4. Since 1961, day-care centers for children (from 45 days old up to five years of age).
5. Lunches at primary schools for the children of working women.
6. Scholarships for students at all levels of education.
7. Assignment of jobs by the State for all those graduating from university as well as from professional and technical high schools.
8. Requirement that divorced parents pay their children's alimony.
9. Pensions from social security to those retiring from the active labor force.
10. The right of all those working for the State to a paid month's vacation every year.
11. A variety of public health services: breast and uterine cancer tests; vaccination; access to institutions at all levels of public health (family doctors, polyclinics, hospitals, specialized research centers).

P. Before the crisis began in 1989-1990, women workers had benefited from the above-mentioned measures. Like the Cuban population as a whole, they had experienced decades of sustained economic growth. Everyone—men and women alike—had access to a relatively equal distribution of income and decent levels of human development. Therefore, at the beginning of the crisis several indexes related to the quality of Cuban human resources were higher than those of other Third World Countries.

Four points explain why Cuban working women stayed at their jobs throughout the years of crisis and readjustment:

1. Approximately one third of Cuban women wage-earners head their household; either they are the sole bread winners in their homes or theirs is the higher income. This figure increases if we include all working women who either remarry or establish other types of unions.
2. At present, women account for two-thirds of all Cuban professional and technical workers. Thus Cuban women represent the majority of the highly skilled labor force which is needed in a country whose development strategy is based on promoting economic activities requiring sophisticated technology and efficiency.
3. Since 1970, women wage-earners have dramatically increased their participation in the Cuban labor force.
4. Cuban legal and political regulations promoting women's permanence in the work world remained in force during the crisis years and were adapted to the different changes taking place.

Q. In 1997 The Cuban State Council passed the "Beijing Conference National Action Plan", which is the legal document that summarizes all proposals examined by the 1995 United Nations World Conference on Women. This document expresses the political will of the Cuban government concerning women's advancement. Measures contained in this "Action Plan" are mandates for all Cuban state institutions, and are regularly monitored in study groups organized by the Federation of Cuban Women, with the participation of representatives from these institutions.

R. Having noted the above, it is also necessary to point out that women professional and technical workers, like all women workers, suffer inequalities in their everyday lives that affect them physically and psychologically. I will mention three. First, a survey conducted by the National Office of Statistics in 1996 reported that women workers

Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women (Part II)



Objectives: In this unit you will get more insight on the way social scientists report on a case study and on the occasional use of quotations to present some of the opinions collected. Exercises have been built around the selected reading excerpts to expand your vocabulary and further develop your listening, speaking and writing skills. In this part of the article you will find first-hand information about the strategies Cuban women used during the 90s to keep on working and, at the same time, look after their elderly relatives.

I. Before You Start Reading



1. Listen to Audiotext 5 and complete a list of some alternative activities women have engaged in to earn a second income:

ACTIVITIES

renting _____; cooking and _____ food; sewing and _____; raising chicken and selling _____; working as part-time _____.

2. Do you know any woman who has more than one job? From the list in 1), jot down in your notebook those jobs that women in your neighborhood and/or community have as a second job, that is, as a second source of income. (You may be asked to talk about this in the practice session with your classmates and your language teacher).
3. Does every member of your family contribute to look after the elderly or does this care fall upon one specific person? Share your ideas with a partner.
4. Test you vocabulary. Match the words in Column A with they corresponding equivalent in Spanish in Column B

Column A	Column B
1. freelancer	___ <i>adulto mayor</i>
2. saving accounts	___ <i>asalariado(a)</i>
3. senior adult	___ <i>escasez</i>
4. wage earner	___ <i>presupuesto</i>
5. budget	___ <i>trabajador(a) por cuenta propia</i>
6. shortage	___ <i>cuentas de ahorro</i>

dedicated an average of 34 hours a week to household chores, compared to only 12 hours a week for men. Second, women earn from 80% to 85% of the salaries earned by men. The Cuban Constitution mandates equal pay for equal work. So the reason for this problem is that men are the absolute majority in economic sectors that pay

higher salaries, such as mining and construction. Third, women hold 31% of managerial posts, which is relatively low considering that women represent two thirds of all professional and technical workers. It should also be remembered that these women have attained higher educational levels than men. **(to be continued...)**

IV. Writing

1. Reflect on the following questions.
 - a) What role do Cuban women play in your field of study/profession?
 - b) Has the number of women in your field increased or decreased in the past ten years?
 - c) In your university, are there more women than men studying in your professional field?
2. Based on your reflections, write a paragraph of 175-250 words. If necessary, consult relevant sources of information.

II. Begin Reading

1. Read the following statements

- a) During the special period, most women in the sample decided to work on their own, i.e. they became freelancers. _____.
- b) Women in this study were certain that the special period was a temporary difficult situation that had to have an end. _____.
- c) As common practice, most elderly members of Cuban families are not sent to special institutions because they are looked after in their homes by their relatives. _____.
- d) Several social services and programs were seriously affected during the special period. _____.
- e) All geriatric services stopped functioning in the 90s. _____.

2. Now read the excerpt **Strategies of Cuban women during the 90s to cope with the crisis of the Special Period** and say whether the statements above are true (T) or false (F) in relation to the information provided in this section of the text. If you think a statement is false, change it to make it true. (You may be asked to talk about this in the practice session with your classmates and your language teacher).

Strategies of Cuban Women During the 90s to Cope with the Crisis of the Special Period

I asked the women of my study to describe the strategies they worked out concerning employment and care for the elderly members of their families. I also asked them how much their lifestyles changed because of the shortages they endured during the special period. All the women in the sample continued to work for a salary while, at the same time, holding other jobs in order to earn additional income. Sixteen of them kept their jobs as professionals and technical workers (among them, fifteen worked in the so-called state civil sector, and one became a freelancer). The other two changed professions: a teacher decided to work in a hard currency shop, and a lawyer became a secretary at a joint venture enterprise.

Why did the majority of these women continue to work as professionals or technicians? Among the answers I received to this question was “My profession meant everything to me”. Another said, “Keeping our jobs as professionals meant

struggling for a dream, a goal that has cost us so much”. A third response was, “If you want to find answers to this question, you have to divide your arguments into two parts: one concerning the salary and another concerning the profession itself. The latter was more important than the salary. In the 90s, salaries practically lost their meaning as a stimulus. Meanwhile my profession made me feel worthy. It was like a shield that protected me from all the anguish of the crisis”. Two other answers were the following: “For years I had cultivated my brains, my lifestyle, my looks, and I did not want to lose them”, and “Working as a professional liberated me from the dullness of domestic chores”.

Women in the sample thought that the crisis would eventually end, and they wanted to maintain their professional posts up to the moment when money regained its value and/or salaries were raised. Furthermore, they believed they would disqualify themselves if they stopped practicing their professions.

Throughout the 90s they developed strategies to take care of the elderly members of their families. Cubans over 65 represented almost 10 percent of the population. Moreover, the few nursing homes existing in Cuba basically took care of elderly people without families. Cuban tradition condemns those who “give away” their elderly to these institutions. The widely accepted rule is that elderly relatives must stay with their children or grandchildren. In our society, women over forty-five years of age are usually responsible for taking care of the senior adults in their families. During the 90s all eighteen women in the sample looked after their elderly without quitting their jobs.

Prior to the crisis, Cuba had benefited from social policies, programs, and institutions aimed at providing decent living standards for third-age citizens. These included social security programs, geriatric services at polyclinics and hospitals, the services of family doctors (one for every 120 families, who live in the same neighborhood as their patients), grandparents’ clubs and the so-called “day-care facilities” for third age citizens (elderly people use these facilities from 8:00 a.m. to 5:00 p.m.). TV and radio stations ran spot advertisements designed to promote an attitude of respect and understanding towards the elderly. If these services had been able to keep functioning during the 90s, and had been able to adapt themselves to the real

needs of elderly people, they would have supported working women over 45 years of age. But the crisis adversely affected these services: food and medicines were scarce; most grandparents’ clubs closed, and no new day-care facilities for the elderly were opened. Geriatric services and family doctors continued to function, but amidst enormous material shortages.

All the women in my sample decided to remain wage earners because they could not afford to lose their incomes. At the same time, none of them consigned elderly members of their families to nursing homes. Thirteen women involved almost all members of their immediate and extended families in sharing the tasks of looking after the elderly. This meant enlisting the help of their children, cousins, aunts and uncles, and available friends. Occasionally they hired non-family members when their incomes allowed them to do so. They devoted the largest part of their budget to feeding their children and the elderly. Without exception the women in the sample relied on family doctors and nurses to provide for the health care of the elderly. They took them to hospitals only when they needed specialists. The medicines they used came from donations distributed through the drugstore system or were sent by relatives or friends living permanently or temporarily outside of Cuba. They also began to use “green medicine”.

III. Keep on Reading

1. Go back to the paragraph which includes information about services for third-age citizens before and during the special period. Take some notes and prepare, in not more than 100 words, the response you would give to someone asking you how these services were like in the 70s and 80s, how they were later affected and how working women with elderly relatives were affected as well. (You may be asked to talk about this in the practice session with your classmates and your language teacher).
2. Scan through the following two paragraphs to find:
 - a) the three most common means of transportation used by women to go to work during the special period.
 - b) a definition given by the author of what is popularly called “a camel” in Cuban society.
 - c) one strong reason given in the article for opening saving accounts during the special period.

Women's lifestyles changed considerably. In terms of public and private transportation, —because of huge fuel shortages and lack of spare parts for buses, cars, and trucks made in the Soviet Union and Eastern Europe—, five of the women rode bicycles, one was able to keep her car running and linked to her work place (meaning that she received a gasoline quota), while the rest walked, hitch-hiked, or rode on “camels” (two huge humped cabins dragged by trucks). Two women said that they usually walked seven miles two or three times a week.

Thirteen of the eighteen women in the sample opened savings accounts. Before the crisis they lived in an up to date manner, because their salaries covered their expenses. Those who accumulated bank savings spent the money during their yearly vacations or used it to repair their homes. Now they save for any possible illness that might keep them from working, or that might affect other family members who would require additional care and expense.

(to be continued...)

IV. Writing

Write a short report on some answers quoted by the author in this part of the text. Do not use quotations. Change what the women said from **direct speech** into **indirect or reported speech**.

Example:

Direct speech: **Antonia said: “My job is fascinating.”**

Reported speech: **Antonia said that her job was fascinating.**

Here are the quotations:

Woman No.1: “My profession meant everything to me”.

Woman No.2: “Keeping our jobs as professionals meant struggling for a dream, a goal that has cost us so much”.

Woman No.3: “If you want to find answers to this question, you have to divide your arguments into two parts: one concerning the salary and another concerning the profession itself. The latter was more important than the salary. In the 90s, salaries practically lost their meaning as a stimulus. Meanwhile my profession made me feel worthy. It was like a shield that protected me from all the anguish of the crisis”.

Woman No.4: “For years I cultivated my brains, my lifestyle, my looks, and I did not want to lose them”.

Woman No. 5: “Working as a professional liberated me from the dullness of domestic chores”.

Begin your report like this:

The specialist conducting the study was interested in finding answers to why most Cuban professionals and technicians remained working as such during the special period. Here are the answers given by five of the women.

Continue you report in the following manner: (The first one has been done for you)

The first woman said that her profession meant everything to her. The second woman declared that The third woman emphasized The fourth woman remarked The fifth woman told the specialist that.....

Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women (Part III)



Objectives: In this unit, while improving your command of English, you will become acquainted with the way specialists report on the conclusions they arrive at in their studies. Exercises have been built around the selected reading excerpts to help you better understand the author's main points and conclusions. This will give you food for thought and provide information that can be used in a debate on this period of the recent Cuban history. In addition you will find activities to further develop your listening, speaking and writing skills.

I. Before You Start Reading

1. Male chauvinism or *macho* culture is an aspect of our culture which, some believe, is shared by the rest of the Latin world. In your opinion, is this as strong in Cuba now as it used to be in the past? Share your ideas with a partner. (You may be asked to talk about this in the practice session with your language teacher and classmates).



2. Listen to Audiotape 6 and jot down the missing words to complete the following statements.

Women work and _____ salaries. This has made them _____. Some husbands earn _____ and some _____ are _____ to _____ managers. Just like men, women have _____ to be trained in their _____ and _____ them. Women command more _____ now because they no longer _____ acts by men. Cuban women's participation has _____ in practically all _____ of _____, not only within Cuba but in _____ missions as well. Our women receive _____ at _____, in their _____ and _____.

3. Bear in mind

Conclusion

A **conclusion** is the closing part of a discourse (oral or written) where authors express the judgement, decision or opinion formed after investigation. It is the last step of a reasoning process.

Conclusions generally include some sentences that recall the main points made, and also sentences which might give advice or recommend changes.

II. Begin Reading

Scan through the text to find the answers to these questions:

1. According to the author, how many phases did Cuban women live through during the special period?
2. How many new economic measures that helped women succeed in their survival strategies are mentioned in this text?

Other Responses to the Special Period

These women lived through four phases during the crisis of the 90s. The first was a moment of surprise at the collapse of the socialist countries and the decrease in their personal standards of living, all of which happened in less than a year. They were taken by surprise even though, in 1990, at the Congress of the Federation of Cuban Women, Fidel had warned the country that conditions would become worse. The second was depression, anguish, and bewilderment, because living standards kept deteriorating in all spheres: food, medicines, transportation, domestic fuel, electricity. Furthermore, many workplaces closed. People compared this dramatic situation with the relatively high living standards fostered by the Revolution since the 1960s, which had been marked by rising levels of social mobility. This was the moment when no one saw the light at the end of the tunnel.

The third phase took place when these women decided to emerge from their depression by ways unsuspected up to then. At this moment they made personal decisions: they changed jobs or took an additional one; they sold everything that could be sold; they decided to emigrate or to stay; they moved from their homes, their provinces or the towns where they lived; they divorced or stayed with their husbands. They did everything needed to pay for basic food for their children and elderly members of their families and to buy clothing and shoes for the younger members. Accustomed for many years to living under the protection of the state, they now had to learn to define or redefine their life projects by themselves, with very little help from the State. They started looking more to their communities and neighborhoods for support.

The fourth moment, the one they are living through now, and that has been enriched by the experiences of the previous three, involves a determination not to go back to the calamities of the first crisis years. Throughout these four phases, women in the sample prepared their children to confront any kind of obstacle. They have insisted on the need to keep studying. They have taken charge of their personal health, especially the illnesses that resulted from lack of adequate nutrition and the emotional stress they had to endure in their everyday lives for almost seven years.

The following factors explain why these women's survival strategies were successful during the crisis years.

First of all, social policies, legal frameworks and subsequent measures aimed at incorporating women into work life were not abolished. As I explained in the first part of this article, these policies were adjusted and new ones were enacted. Second, new economic measures were enacted according to changes in domestic conditions and external relationships. Seven of these were as follows:

1. In 1992 the government approved the creation of self-financed enterprises operating with hard currency. These were enterprises and state agencies that were already selling their products and services in hard currency. Thanks to this authorization, they started using their incomes to cover the operational costs as well as to stimulate their workers.
2. Decree No. 140 of 1993 allowed Cubans to use hard currency inside Cuba. It permitted Cubans to receive remittances in hard currencies

- from abroad, opened exchange offices all over the country, and extended the chains of shops in dollars.
3. In 1993 self-employment expanded. Beginning in 1997 citizens were allowed to rent rooms in hard currency.
 4. Central state agencies were restructured in 1994, based on Decree No. 147. For example, fifteen state ministries, institutes, and committees were abolished.
 5. Agricultural goods and handicraft markets opened in 1994.
 6. Law No. 77 concerning foreign investments was enacted in September 1995, replacing Decree No. 50 of 1982. Its aim was to promote joint ventures with foreign capital, in order to ensure markets and obtain top technology and financial resources that would complement the Cuban side.
 7. A new enterprise system was enacted in 1998.
- (to be continued...)

III. Keep on Reading

Scan through text to find answers to these questions: (You may be asked to talk about this in the practice session with your classmates and your language teacher).

1. What reasons are given to explain that during the special period neighborhoods and neighbors became more important in the lives of women in the sample?
2. The author points out that Cubans had previously enjoyed higher and more equitable standards of living. Why does she conclude that this led to positive and negative reactions during the special period?
3. Why can it be asserted that Cuban women's participation in society was enhanced in the years of severe economic contraction?
4. What lessons can the world learn from the way Cuban society tackled the special period?
5. What recommendation does the author make to the community of social scientists in Cuba?

Other Responses to the Special Period (contd)

Third, living in the neighborhood and the community has become more relevant in people's everyday life. Women in the sample acknowledged that now they spend more time in their neighborhoods because they are working near their homes and because they look for more help among their neighbors. They also do so because they have worked out part of their strategies to seek a second income with the help of neighbors; and finally because they have grown accustomed to consulting their family doctor and the nearby clinic instead of relying on hospitals.

Fourth, in the 60s, 70s and 80s Cuba achieved high rates of social mobility. This trend was not

concentrated in the national capital, or in the provincial ones, and thus it allowed practically all Cubans to attain higher levels of education, health, nutrition, and social security than the levels existing during the 1950s in Cuba, and far more equitable living standards than those prevailing in other Third World countries. This became a positive characteristic for women in the sample, in the sense that it created certain "reserves" with which these women professionals and technical workers were able to face the crisis. But it had a negative side as well, since these women strongly felt and understood how much they had lost when living standards fell.

Fifth, the actions and ideas aimed at struggling against all forms of discrimination did not stop during the 90s. Cuban women played an essential role in the survival of their families and of Cuba's economy, and this helped increase their self-esteem. The crisis made inequalities between women and men even more visible. It also underlined Cuban women's potentialities, strengths, and ability to overcome the crisis at the individual level, as well as at the levels of the family, the community, and the nation. No doubt, Cuban women have come out of the crisis stronger.

Sixth, certain characteristics of Cuban social psychology contributed to women's creativity, among which are flexibility, a non-dogmatic approach to life, and the ability to assimilate and promote necessary changes in lifestyle.

It should be noted that women in the sample had to construct their strategies while living in a still patriarchal society, where they are burdened with the "double shift", where men predominate among managers, and where women earn 80% of men's salaries, although law establishes equal pay for equal work.

Conclusions

The history of women's employment in Cuba since the Revolution includes the high proportion of women professionals and technicians in the work force; indeed, the majority of Cuban working women are grouped in this category. The reasons

for this must be sought in changes undergone by Cuban society since 1959, in terms of economy, politics, and ideology. Cuba's revolutionary project aims at eliminating all kinds of discrimination, including gender discrimination. It has been a hard and highly contradictory process but also one that has yielded many satisfactions; a process that has transformed the gender ideology of most Cubans.

This process of change and gradual transformation did not stop during the years of crisis and readjustments of the 1990s; there were no substantial backlashes. However, the critical awareness of policies affecting women that has prevailed over the past forty years must be maintained. Cuba is emerging from a crisis of almost ten years by using its own methods that were conceived and applied in short periods. These methods had practically no analogies in the Eastern European countries after the crumbling of socialism. Cuba has strongly promoted higher standards of efficiency and the use of high technology as ways of surmounting the crisis. Development strategies derived from this conception cannot ignore women, especially as women have attained higher educational levels than men in the work force and constitute two thirds of all Cuban professionals and technicians.

Cuban social scientists have seriously and creatively studied gender relations, emphasizing women. The same intensive effort must be made to understand scientifically what has happened to Cuban men during the last forty years.

Notes:

backlashes = *reacciones adversas*

critical awareness = *conciencia crítica*

crumbling = *desmoronamiento*

IV. Writing

Several social programs which started in the 2000s clearly show an economic recovery of Cuban society. These programs have had a positive impact in the lives of Cuban women. Choose one of these programs and collect relevant data to write, in 175-200 words, how it has helped change the situation faced by women in the 90s.

ANSWER KEY

Answer Key

Unit 1

I. Before You Start Reading

1. technological - organisms - modify - processes
2. biotechnology - techniques - problems - analysis - on the other hand - biological -goal

II. Begin Reading

1. They work or have worked at CIGB. Four of them have worked in the GNDP. The majority has worked for more than ten years in the sector.
2. Objective: analysis of the biotechnology development in Cuba for 20 years

Main ideas:

- evolution of the biotechnology sector since the 1980s,
- Structure and scientific and technical results
- discoveries, methodologies, technologies, and products developed

III. Keep on Reading

A. Possible answers:

1. Cuba obtained good results in training scientists and engineers to become researchers: above the mean value of Latin America (0.4), and close to that of Europe (2.0). These favourable conditions permitted a new development programme to be established.
2. 1980
3.
 - I. The investor has been the Cuban government.
 - II. Biotechnology is part of the health system, and for this reason the national needs are the first priority.
 - III. The research output is generated entirely by native rather migrant scientists and professionals.
 - IV. Operating capacity in a 'closed cycle': from research to commercialization by fully integrated institutions and profits from sales overseas.
 - V. National collaboration instead of individual competition as the driving force
 - VI. Spin-out companies derived from scientific and / or production institutions.
 - VII. improvement in the ability to access foreign markets, particularly in the developed world, based on quality, production volumes, cost, novelty, and joint ventures.

4. The urgency for immediate application of scientific results

B. Drawing info from the main body of the paper

1. 4.

2. cartera (de proyectos)

3.

Products already developed and their uses	Products in different development stages
1. CITOPROT-P ® Use: treatment of diabetic foot ulcers	therapeutic version of the anti-Hepatitis-B vaccine
2. CIGB-300 Use: cervical intraepithelial neoplasia and carcinoma <i>in situ</i>	anti-dengue fever, anti-hepatitis C, and anticancer vaccines.
3. <i>Haemophilus influenzae</i> type b vaccine	
4. Recombinant vaccine for Hepatitis-B	
5. Thrombolytic recombinant streptokinase,	
6. Human recombinant erythropoietin	
7. Granulocyte colony-stimulating factor,	
8. Alpha and gamma interferons	
9. Acuabio-1 Use: growth and survival of farmed fish	

4.

Application of Biotechnology tools to:	Features
Obtain Hepatitis B vaccine	1992- immunogenic, with excellent safety and efficacy-12 years of clinical experience-
Obtain Hepatitis C vaccine	A DNA vaccine formulation based on a construct comprising the genes for the three main structural antigens
Obtain <i>Haemophilus influenzae</i> type b vaccine	based on synthetic oligosaccharides that mimic the natural capsular polysaccharide conjugated with the tetanus toxoid carrier protein. It is immunogenic, safe, and very well tolerated.

4. (contd)

Application of Biotechnology tools to:	Features
obtain new plant varieties	resistant to pests and drought
obtain advanced diagnostic systems for plant and animal diseases	
obtain and produce vaccines for cattle and poultry	
obtain bioproducts for agriculture	
improve the efficiency of plant and animal breeding	
develop transgenic plants	resistant to biotic and abiotic stresses
use plants and animals as bioreactors	

IV. Listening

1.

a) Basic Local Alignment Search Tool

b) for comparing primary biological sequence information / for comparing a query sequence with a database of sequences, and identify the sequences that resemble the query sequence above a certain thresholdc) amino-acid sequences of different proteins or the nucleotides of DNA sequences.

2. gene - mouse - perform - human genome - carry - identify - resemble

UNIT 2**I. Before You Start Reading**

1. pathway

2. virus

3. virus

4. host

5. pathway

6. host

II. Begin Reading

Line of Basic Research	Scientific discoveries and outcomes
Study of <i>Neisseria meningitides</i>	Finding of a gene /protein carrier for vaccine design
Finding of Peptide (P15-Tat)	In cancer therapy
Life-cycle of HCV	To understand functions of the viral proteins during HCV infection and to find targets for drug design.
Antibody generation	To implement a faster protocol with higher specific enrichment factors.

III. Keep on Reading

1.

Fig. 1. Trials with recombinant streptokinase

Fig. 2. Incidence of hepatitis B vaccine in Cuba

Fig. 3. Efficacy of CITOPROT-P®

2.

Other facts on CIGB's Health Impact

Large-scale production of Hib	99.7 % efficacy in clinical trials
Recombinant humanized antibody against epidermal growth factor for cancer therapy	Transiently expressed in tobacco leaves, correctly assembled and retained its biological activity
Safe Trivac-HB ® against diphtheria, tetanus, whooping cough and hepatitis B	For children

IV. Writing

Factors that have made possible the development of the biotechnology industry in Cuba

- Universal access to education
- Integration and collaboration of institutions
- Suitable intellectual property policy, planning and evaluation, rational resource allocation
- Attention to global scale problems
- Mutual access to novel approaches and results increases success
- The rationale for the development of the biotechnology industry

UNIT 3

I. Before You Start Reading

3.

- a) nitrogen-fixing
- b) stem
- c) assays

II. Begin Reading

2.

- a) Aims
- b) A new endophytic nitrogen-fixing bacterium was identified: *Pantoea* sp.
- c) Agriculture

III. Keep on Reading

A.

- ☒ Most common nitrogen-fixing micro organisms previously studied
- ☒ Interest of Cuban researchers in biological nitrogen fixation
- ☒ Biological nitrogen fixation importance

C. Expand Your Vocabulary

1.

Verb	Noun	Adjective
fix	fixation	fixing, fixed
remove	removal	removable
collaborate	collaboration, collaborator	collaborative
grow	growth	grown
locate	location	locational, local
isolate	isolate, isolation	isolated

2.

- a) isolates
- b) fixing
- c) grow

IV. Listening and Speaking

1.

- a) Cuban and Canadian
- b) University of Havana and Carleton University
- c) To locate an endophytic bacterium somewhere in sugarcane stems.
- d) Inside the xylem of the plant, of the stems.
- e) It was not feasible because the plant is very unhappy if it has bacteria in its water-conducting tubes. It will make mucilages which will plug up the tubes so the bacteria get stopped. But the other trouble is that the water gets stopped going up to the shoot and the plant would die.

2.

- a) electron microscope
- b) Some bacteria were found in the spaces between the cells, not inside the cells, but in the spaces between the parenchyma cells.
- c) one by which the researcher could remove the contents of the spaces between the cells.
- d) This space wasn't empty, and from that fluid that he removed, he was able to isolate the *Gluconacetobacter diazotrophicus*.
- e) For the first time an endophytic bacterium was found inside extracellular spaces in a grass.

IV. Writing

Possible answer

An experiment to locate a N₂-fixing endophytic bacterium

Abstract

Aims: To locate a N₂ fixing endophytic bacterium somewhere in the sugarcane stems.

Methods and results: Using the electron microscope in the different regions of the plant, some bacteria were found in the spaces between the cells, not inside the cells, but in spaces between the parenchyma cells. A technique by which the experimenter could remove the contents of the spaces between the cells was used. And the fluid contained —a frozen sugar solution – was removed. And from that fluid removed *Gluconacetobacter diazotrophicus* was isolated.

Conclusions: a N₂ fixing bacterium is found inside extracellular spaces in sugarcane stem.

Significance and Impact of the Study: For the first time an endophytic bacterium *Gluconacetobacter diazotrophicus* was found inside extracellular spaces in a grass.

UNIT 4

I. Before You Start Reading

- a) M & M
- b) R
- c) M & M
- d) R
- e) R
- f) R
- g) M & M
- h) M & M
- i) M & M
- j) R

II. Begin Reading

2.

Solutions and substances used	Solid materials used	Methods used
Tap water	Roots	Sterilization
Solutions and substances used	Solid materials used	Methods used
Sterile distilled water	Pieces of stem	Flame
5% chloramine T solution	Cylinder of parenchyma tissue	Centrifugation
70% ethanol	Escherichia coli	Acetylene Reduction Assay
Sterile 5% sucrose solution		Soaking
Sap of apical internodes		Protocol of Ausubel
Dilutions of root extract		

III. Keep on Reading

Features	
Bacterium (9C) species/ genera	Species of <i>Pantoea</i>
Biochemical characteristics:	
Different from <i>Klebsiella</i> because:	<ul style="list-style-type: none"> • It has flagella • It is positive for ornithine and lysine decarboxylase and for cytochrome c oxidase; • It is negative for nitrate reductase.
Different from <i>Enterobacter</i> because:	<ul style="list-style-type: none"> • It is negative to the Voges–Proskauer test and to the gelatine liquefaction assay.
Different from <i>P. agglomerans</i> because:	<ul style="list-style-type: none"> • It is positive for ornithine decarboxylase activity
Capacity to:	produce considerable amounts of hydrogen
Ability to:	grow where the water activity was as low as 0.95 (10% NaCl).

IV. Listening and Speaking

2.

	Audiotext 4	Scientific article
Name of the bacterium	<i>Gluconacetobacter diazotrophicus</i>	<i>Pantoea. sp</i>
Common features	<ul style="list-style-type: none"> – Nitrogen-fixing bacteria – Found in sugarcane stems and roots 	
Other features	<ul style="list-style-type: none"> – Fixes nitrogen from the air in the presence of nitrate fertilizer – Lives in a high sugar concentration – Lives at a low pH 	<ul style="list-style-type: none"> – capable of producing great amounts of H₂ – Reduces acetylene in nitrogen-free media – Lives in a wide range of temperature, pH and salt concentration – Able to grow when water activity is low

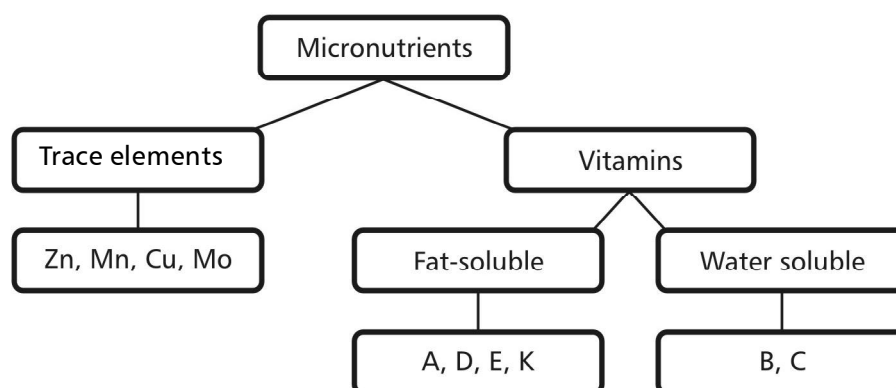
UNIT 5

I. Before You Start Reading

A.

1. An antioxidant is any of a group of chemical compounds that may prevent certain types of cell damage.
2. Antioxidants block the effects of oxidation, a chemical reaction in which a substance loses electrons, often while combining with oxygen.
3. The body naturally produces certain enzymes that are antioxidants. In addition, vitamins C and E and certain plant chemicals, such as carotenoids and flavonoids are antioxidants.

B.



II. Begin Reading

1. It reviews the epidemiological evidences that micronutrients and antioxidants may confer benefit to HIV infected patients.
2. micronutrient supplementation as a cost-effective strategy for preventing vertical HIV transmission

III. Keep on Reading

1.

Chart A.

One rejected theory about the origin of HIV	
Sources of HIV-1	chimpanzee
Via of HIV contamination for humans	Oral Polio Vaccine (OPV)
Reasons for HIV contamination with OPV	Chimpanzee tissues used in the preparation of OPV

Chart A.

Sources of HIV Transmission
Sexual intercourse
Blood transfusions
Intravenous drug use

2.

- a) amount of people infected with HIV in 2003: 40 million
- b) amount of new cases: 5.3 million new cases
- c) places mostly affected by AIDS(%): sub-Saharan Africa, South Asia, and Southeast Asia-95%
- d) affected age group % : more than 10% adults (15-30% pregnant women)

4. c), a), b), e), f), g), d)

6.

4.

2.

3.

1.

3.

2.

4.

1.

UNIT 6

I. Before You Start Reading

A

1. The immune system is ...

2. Pathogens are....

3. The immune system reacts to...

4. The substances that trigger...

B

... a group of cells, molecules, and tissues that help defend the body against pathogens and other harmful invaders.

... disease-causing organisms, such as bacteria, fungi, parasites, and viruses.

... pathogens through a series of steps known as the immune response.

... an immune response are called antigens.

5. Physicians give ... their patients vaccines to help protect them from certain severe, life-threatening infections.
6. Vaccines and serums boost... the body's ability to defend itself against particular types of viruses or bacteria.

II. Listening and Speaking

Meningitis	
Definition	a disease that affects the membranes (meninges) covering the brain and spinal cord
Consequences	severe brain damage, death. deafness, paralysis, muscle weakness, mental retardation, blindness, and changes in behavior
Pathogens	bacteria, viruses, fungi, or other microbes (<i>Neisseria meningitides</i> , <i>Haemophilus influenzae type b</i> , and <i>Streptococcus pneumoniae</i>).
Symptoms	fever, nausea, vomiting, loss of appetite, sleepiness, headache, back pain, muscle aches, and sensitivity to light in the eyes, stiff neck.
Diagnosis	by examining a sample of cerebrospinal fluid.(lumbar puncture or spinal tap)

III. Begin Reading

2.

Type of vaccines effective against bacterial diseases	Glycoconjugate vaccines
Characteristics of the new vaccine produced in Cuba	Conjugate vaccine composed of a synthetic capsular polysaccharide antigen of <i>Haemophilus influenzae type b</i> (Hib)
	Showed long-term protective antibody titers compared to products prepared with Hib polysaccharide extracted from bacteria
Evidence offered	That access to synthetic complex carbohydrate-based vaccines is feasible and that the study provides a basis for further development of similar approaches to human pathogens

IV. Keep on Reading

1.

- a) In developed countries- Hib was prevalent till the introduction of a vaccine in the 90s. In developing countries- more than 600,000 infant death annually
- b) adults and older children (3-5) ;long lasting immunity in infants
- c) by covalently coupling the polysaccharide to carrier proteins
- d) meningococcal group C and *Streptococcus pneumoniae*

3.

- a) Five
- b) by using synthetic carbohydrate chemistry
- c) - A synthetic pathway with a reduced number of reaction and chromatography purification steps
 - A superior method for the oligomerization of the ribosylribitol-phosphate repeating unit in which the saccharide fragment can be obtained in a single step
- d) materials used :
 - Ribitol derivative & Ribose acetate
 - (They fit best for large-scale production and could be more readily purified)
 - Crystalline peracetylated β -D ribofuranose. It readily glycosidates ribitol derivative

4.

- a) They undertook a one-step polycondensation reaction with the use of H-phosphonate chemistry.
- b) They have an average of 8 repeating units as compared to the 5 repeating units of previous oligomers used.
- c) It was immunogenic in rabbits with a wide range of sPRP/protein ratios, inducing a strong and specific antibody response.

V. Writing

Possible answer

The present study demonstrates that a synthetic capsular polysaccharide antigen can be produced on a large scale under GMP conditions and used to manufacture an effective vaccine for human use. The resulting conjugate vaccine incorporating a synthetic bacterial carbohydrate antigen was demonstrated to be as safe and immunogenic in humans as already licensed vaccines incorporating the native polysaccharide. Access to synthetic complex carbohydrate-based vaccines is therefore feasible and provides an alternative strategy in the fight against Hib infections. It also sets the stage for further development of similar approaches against other human pathogens.

Answer Key

Unit 1

I. Before You Start Reading

1.

"I lived inside the monster and I know its insides and my weapon is the slingshot of David". (*Traducción libre al inglés*)

Original: "Viví en el monstruo y le conozco las entrañas: –y mi honda es la de David". José Martí

"It is better to rise or fall without help than to contract debts of gratitude to a neighbor so powerful". (*Traducción libre al inglés*)

Original: "Es mejor levantarse o caer sin ayuda, que contraer deudas de gratitud con un vecino tan poderoso". Antonio Maceo.

2.

Americans: citizens of the United States of America.

Americans= *estadounidenses*.

II. Begin Reading

A. Dealing with the Structure of the Article

1.

a) the history of US intentions in the late 18th century Par. 1-2

b) a timely warning against US appetites Par. 5

c) a reference to the "ripe fruit premise" Par. 4

d) a concrete example of the "manifest destiny" Par. 2

e) The Pre-1898 history of US intentions Par. 2-7

2. The US "destiny" is to propagate its particular form of economic, social and political organization; first within North America and later throughout the Western Hemisphere.

3. **Methaphor: If an apple, severed by the tempest from its native tree, cannot but fall to the ground,...**

Translation

Si una manzana, arrancada por la tempestad de su árbol original solo puede caer al suelo..., Cuba separada por la fuerza de su conexión artificial con España es incapaz

de mantenerse por sí misma, solo podrá gravitar hacia la Unión Norteamericana, la cual, por la misma ley de la naturaleza, no la podrá arrancar de su seno.

4. According to J.C.. Breckenridge Cubans were indolent and apathetic. They (We) had a vague notion of what was right or wrong, they (we) were not hardworking and they (we) enjoyed violence. (28 words)

B. Expand your vocabulary.

Find the English equivalent to:

- a) *evitar* **avoid**
- b) *dominio español* **Spanish rule**
- c) *dentro de* **within**
- d) *hacia el oeste* **westwards**
- e) *autóctona* **indigenous**
- f) *exterminada* **annihilated**
- g) *contundente* **forceful**
- h) *arrancar de su seno* **cast off its bosom**
- i) *habitantes* **inhabitants**
- j) *cañón* **cannon**
- k) *La Perla de las Antillas* **The Pearl of the Antilles**

III. Keep on Reading

A. Dealing with the Structure of the Article

1.

- a) Conclusions Par. 12
- b) Post 1898 and the first years of the neo-colonial republic Par. 9-10
- c) The year 1898 Par. 8-9
- d) Post 1959 Par. 11-12

3. **Clincher sentence:** As those who manipulate and control the media on a global scale happen to be the same interests served by the policy-makers and strategists that generate these deceptive US actions against Cuba, world public opinion must remain aware of such ripe fruit appetites.

Traducción libre: *Como los que manipulan y controlan los medios de difusión a nivel mundial comparten los mismos intereses que los estrategas y hacedores de políticas que generan acciones turbias contra Cuba, la opinión pública mundial debe mantenerse alerta ante esta apetencia por la fruta madura.*

B. Expand your vocabulary.

- a) *condición*: proviso
- b) *reuniones*: proceedings
- c) *excepto una guerra abierta*: short of all-out war

UNIT 2

I. Before You Start Reading

2.

Fidel, turned into a sort of reporter, receiving and transmitting news and public messages, is an exceptional witness to the formidable counter-coup given by the people and the Bolivarian Armed Forces of Venezuela that led to the reinstatement of the President of the Republic, Hugo Chávez Frías, after the fascist coup d'état of April 11, 2002.

Chapter 24 from the book One Hundred Hours with Fidel, is a thorough and truthful account of these events. It is also an approach to other transcendental issues in Latin America. These include: the struggles of the indigenous peoples; the progressive tradition among Latin America military; the ill-fated Free Trade Area of the Americas (FTAA); a profile of political personalities of the present and the history of Latin America; the failure of neoliberalism and the certainty that a better world is possible.

3. FTAA: Free Trade Area of the Americas = ALCA: Área de Libre Comercio para las Américas

II. Begin Reading

B. Expand your vocabulary.

1.

- a) *lealtad* loyalty
- b) *ser traicionado* be betrayed
- c) *golpistas* putschists
- d) *reanudar* resume
- e) *valiente* brave
- f) *desencadenar* spark
- g) *cazabombardero* fighterbomber
- h) *experiencia terrible* ordeal
- i) *inteligencia* brainpower
- j) *sangre fría* sangfroid

2. a) midday
b) midnight
c) afternoon
d) night

IV. Writing

Over the phone, Commander in Chief Fidel Castro very tactfully gave some ideas and pieces of advice to President Chávez in the early hours on April 12. In that crucial conversation they both evaluated the situation. Here is a report of some of the things that were said by these two outstanding revolutionary leaders.

Fidel told Chávez to prepare the ground for an honorable and dignified agreement, and to preserve the lives of the men that he (Chávez) had. Fidel also told Chávez not to sacrifice them and not to sacrifice himself. With emotion President Chávez replied that they were all prepared to die there. In a heartbeat Fidel told Chávez that he knew (that), but that he thought that right then he (Fidel) could think better than him (Chávez). Fidel recommended Chávez not to resign, and to demand honorable and secure conditions so as to ensure that he was not betrayed.

Unit 3

I. Before You Start Reading

Full name: Marta Núñez-Sarmiento

Occupation: sociologist

Academic rank: full professor

Institution: University of Havana

Nationality: Cuban

Subject: The role and attitudes of professionally and technically trained women during the special period.

Source of information: macroeconomic data and women's own account.

Journal: Socialism and Democracy

Volume: 15 Number: 1 Date: Spring-Summer 2001

Place of publication: New York, USA

II. Begin Reading

- a) F This article reports an independent study.
- b) T The author believes that despite difficulties and limitations during the special period, Cuban women continued to actively participate in the labor force.
- c) T The author has been working on women studies for more than one decade.
- d) F The case study was conducted nation-wide.
- e) T The author uses in her arguments both official information and the opinions and beliefs of 18 women professionals and technicians.

B. Expand Your Vocabulary

- a) *estudio de caso* case study
- b) *fuerza laboral* labor force
- c) *resultados (de investigación), hallazgos* findings
- d) *tendencia* trend
- e) *ideología de género* gender ideology
- f) *toma de decisiones* decision-making

III. Keep on Reading

1. Tick (✓) next to the information which has been included.

Sample and Methods	
<u>✓</u>	marital status
<u> </u>	religion
<u>✓</u>	size of the sample
<u>✓</u>	skin color
<u>✓</u>	age
<u> </u>	political affiliation
<u>✓</u>	salary earned
<u>✓</u>	municipality
<u> </u>	sexual orientation
<u>✓</u>	education

2. Scan through the excerpt **Some Useful Statistics** in order to find the information you need to underline the correct word/expression in each sentence.
- a) The proportion of women in the total labor force in the period between 1970 and 1989 (significantly increased-slightly increased)

- b) In 1997 (more-fewer) women worked in the state sector.
- c) The percentage of women in the cooperative sector (rose-decreased) in 1997.
- d) The trend of higher percentages of women professionals and technicians in the total Cuban labor force (stopped abruptly-continued) during the special period.
- e) There are (more-fewer) men than women in the educational sector, public health, sports, and tourism.
- f) In 1994, (more-less) than half the district attorneys in Cuba were women.

Column A	Column B
a) bread winner	<u>e</u> mundo del trabajo
b) wage-earners	<u>a</u> sostén económico
c) sustained economic growth	<u>d</u> estrategia de desarrollo
d) development strategy	<u>c</u> crecimiento económico sostenido
e) work world	<u>b</u> asalariado/a

UNIT 4

I. Before You Start Reading

1.

ACTIVITIES

renting rooms; cooking and selling food ; sewing and knitting; raising chicken and selling eggs; working as part-time university teachers.

4.

Column A	Column B
1. freelancer	<u>3</u> adulto mayor
2. saving accounts	<u>4</u> asalariado(a)
3. senior adult	<u>6</u> escasez
4. wage earner	<u>5</u> presupuesto
5. budget	<u>1</u> trabajador(a) por cuenta propia
6. shortage	<u>2</u> cuentas de ahorro

II. Begin Reading

- a) F Only one woman in the sample became a freelancer.
- b) T
- c) T
- d) T
- e) F Although with enormous shortages, geriatric services and family doctors continued to function.

III. Keep on Reading

2.

- a) on bicycles, by "camel", on foot.
- b) "A camel" is a means of transportation made of two huge humped cabins dragged by trucks.
- c) Women opened saving accounts for any possible illness that might keep them from working, or that might affect other family members who would require additional care and expense.

IV. Writing

The specialist conducting the study was interested in finding answers to why most Cuban professionals and technicians remained working as such during the special period. Here are the answers given by five of the women.

The first woman said that her profession meant everything to her. The second woman declared that keeping their jobs as professionals meant struggling for a dream, a goal that had cost them so much. The third woman emphasized that if you wanted to find answers to that question, you had to divide your arguments into two parts: one concerning the salary and another concerning the profession itself. The latter had been more important than the salary. In the 90s, salaries had practically lost their meaning as a stimulus. Meanwhile her profession had made her feel worthy. It had been like a shield that had protected her from all the anguish of the crisis. The fourth woman remarked that for years she had cultivated her brains, her lifestyle, her looks, and that she had not wanted to lose them. The fifth woman told the specialist that working as a professional had liberated her from the dullness of domestic chores.

UNIT 5

I. Before You Start Reading

2.

Women work and **earn** salaries. This has made them **more independent**. Some husbands earn **less than their wives** and some **men** are **subordinate** to **women** managers. Just like men, women have **the opportunity** to be trained in their **professions** and **to practice** them. Women command more **respect** now because they no longer **tolerate violent** acts by men.

Cuban women's participation has **increased** in practically all **spheres of society**, not only within Cuba but in **internationalist** missions as well. Our women receive **recognition** at **home**, in their **communities** and **abroad**.

II. Begin Reading

1. Four phases
2. Seven.

TAPESCRIP

Tapescripts

Section 1: Science and Technology (Side A)

Unit 1 Biotechnology in Cuba (Part I)

Audiotext 1

In bioinformatics, **Basic Local Alignment Search Tool**, or **BLAST**, is an algorithm for comparing primary biological sequence information, such as the amino-acid sequences of different proteins or the nucleotides of DNA sequences. A *BLAST* search enables a researcher to compare a query sequence with a database of sequences, and identify the sequences that resemble the query sequence above a certain threshold. For example, following the discovery of a previously unknown gene in the mouse, a scientist will typically perform a BLAST search of the human genome to see if human beings carry a similar gene; BLAST will identify sequences in the human genome that resemble the mouse gene based on similarity of sequence.

Unit 3. A New Bacterium (I)

Audiotext 2

In collaboration with a team of Cuban researchers from the University of Havana, a group of Canadian researchers started out at Carleton University a study to try to locate an endophytic bacteria that they knew were somewhere in sugarcane stems. It was originally thought...that is, people at first thought, that the bacteria might be inside the xylem of the plant... of the stem. But anyone who is a plant physiologist would understand that that is not a good place for them to be. Originally some people thought –and still some think– that the bacteria live in these water-conducting tubes. But the Cuban-Canadian team thought that that was not feasible because the plant is very unhappy if it has bacteria in its water-conducting tubes. And it will make mucilages which will plug up the tubes and so the bacteria get stopped. But the other trouble is that the water gets stopped going up to the shoot and the plant would die. So we thought that it was important to look somewhere else for the bacteria.

Unit 3. A New Bacterium (I)

Audiotext 3

One member of the research team began to look with the electron microscope in the different regions of the plant and he found some bacteria in the spaces between the cells, not inside the cells, but in spaces between the parenchyma cells. And he was able to work out a technique by which he could remove the contents of the spaces between the cells. There is a space there that is full of solution. These are actually frozen specimens so that is frozen sugar solution. But he worked out a technique to

remove the fluid so that, this space wasn't empty. And from that fluid that he removed, he was able to isolate the *Gluconacetobacter diazotrophicus*. That was very exciting because nobody had found an endophytic bacterium inside extracellular spaces in a grass.

Unit 4. A New Bacterium (II)

Audiotext 4

"The *Gluconacetobacter diazotrophicus* is a very unusual nitrogen-fixing bacterium. Probably its most unique feature is that it can fix nitrogen from the air in the presence of nitrate fertilizer and that is because it has no enzyme, no nitrate reductase that allows it to use that fertilizer. Almost all other nitrogen-fixing bacteria have nitrate reductase and therefore they will not fix nitrogen themselves if there is nitrate fertilizer about because it's a lot cheaper for them energetically to use nitrate than to fix their own nitrate fertilizer. So, that's very important, the use of this bacterium as a biofertilizer.

Another interesting feature of the bacterium is that it lives in sucrose. It prefers 10 to 12 % sucrose but it can live and fix nitrogen actually up to 30% sucrose and that is really quite unknown in any other bacterium. Now, it also prefers to live at a low PH, a PH of about 5.5. and of course, that, those, are exactly the conditions that are in the intercellular spaces in the sugarcane where it is living. That is, a PH of about 5.5. and a sugar concentration between 10 and 12%".

Unit 5. Antioxidants, Micronutrients and HIV

Audiotext 5

Micronutrients are substances required by an organism from its environment for healthy growth, but they are only needed in minute amounts. Micronutrients include trace elements and vitamins. Trace elements include zinc, manganese, copper and molybdenum. On the other hand, vitamins are classified into fat-soluble (lipids) and water-soluble forms. For humans the only lipid vitamins are A, D, E and K, all stored in the liver, while all water-soluble vitamins such as the vitamin B complex and vitamin C are converted to coenzymes, accounting for the small amounts needed.

Unit 6. A New Vaccine Developed in Cuba

Audiotext 6

Today I'm going to talk ...briefly ...about Meningitis. I'll give its definition, then move on to the consequences, the pathogens involved, its symptoms and finally ... the diagnosis. Meningitis is a disease that affects the membranes covering the brain and spinal cord. These membranes are called the meninges. The disease also affects the cerebrospinal fluid, which surrounds the brain and spinal cord. Meningitis results from infection by bacteria, viruses, fungi, or other microbes.

Meningitis can attack people of all ages, but it most frequently strikes infants and children. Most victims recover completely from the disease. However, bacterial meningitis can cause severe brain damage and even death. Bacterial meningitis also can result in deafness, paralysis, muscle weakness, mental retardation, blindness, and changes in behavior. Most cases of bacterial meningitis result from infection by one of three types of bacteria: *Neisseria meningitidis*, *Haemophilus influenzae* type b, and *Streptococcus pneumoniae*. Several viruses also cause meningitis.

In general, the symptoms of bacterial meningitis are more severe than those of viral meningitis. The symptoms also vary with the age of the patient. Among infants and young children, the symptoms include fever, nausea, vomiting, loss of appetite, and sleepiness. Among older children and adults, symptoms often include headache, back pain, muscle aches, and sensitivity to light in the eyes. Many victims also have a stiff neck.

Doctors diagnose meningitis by examining a sample of the patient's cerebrospinal fluid. This sample is obtained by inserting a needle between the vertebrae in the lower part of the back. This procedure is known as a lumbar puncture or spinal tap. The fluid of victims of bacterial meningitis contains a high level of protein and a low level of glucose...

Unit 6. A New Vaccine Developed in Cuba

Audiotext 7

Glycoconjugate vaccines provide effective prophylaxis against bacterial infections. To date, however, no commercial vaccine has been available in which the key carbohydrate antigens are produced synthetically. We describe the large-scale synthesis, pharmaceutical development and clinical evaluation of a conjugate vaccine composed of a synthetic capsular polysaccharide antigen of *Haemophilus influenzae* Type b (Hib). The vaccine was evaluated in clinical trials in Cuba and showed long-term protective antibody titers that compared favorably to licensed products prepared with the Hib polysaccharide extracted from bacteria. This demonstrates that access to synthetic complex carbohydrate-based vaccines is feasible and provides a basis for further development of similar approaches for other human pathogens.

Unit 7. Additional Text

Audiotext 8

Well, you already know that there are 5 chief types of environmental pollution: air pollution, water pollution, soil pollution, pollution caused by solid waste and hazardous waste; and noise pollution. But today we are just going to deal with water pollution. There are three chief sources of water pollution. These sources are (1) industrial wastes, (2) sewage, and (3) agricultural chemicals and wastes.

Let's begin by explaining the first source: industrial wastes. As you know industries still discharge chemical wastes directly into natural bodies of water. In addition, the

burning of coal, oil, and other fuels by power plants, factories, and motor vehicles releases sulfur and nitrogen oxides into the air. These pollutants cause acid rain, which enters streams and lakes. Some industries pollute water in yet another way. They use large quantities of water to cool certain equipment. Heat from the equipment makes the water hot. The industries then discharge the hot water into rivers and lakes, heating those bodies of water. Such heating that harms plants or animals is known as thermal pollution.

The second source: sewage.... It consists of human wastes, garbage, and water that have been used for washing and cleaning. Some of the sewage goes through treatment plants that remove solids and such dissolved substances as the nutrients nitrogen and phosphorus. Some sewage still goes untreated directly into waterways or the ocean. However, regulations controlling the amount and the quality of the discharge are being discussed.

And finally, the agricultural chemicals and wastes. Water from rain or melted snow flows from farmland into streams, carrying chemical fertilizers and pesticides that farmers have used on the land. Animal wastes can also cause water pollution, particularly from feed lots with many animals. Cattle, sheep, and poultry raised on feed lots do not distribute their wastes over widespread pastureland. Instead, much of their wastes runs off into nearby streams. Water used for irrigation also may be polluted by salt, agricultural pesticides and toxic chemicals on the soil surface before it flows back into the ground.

Section 2: Social Studies (Side B)

Unit 1. The Ripe Fruit Syndrome

Audiotext 1

When José Martí was killed in the battlefields on May 19, 1895, the Cuban Revolution lost not only the man who had painstakingly planned and organized the insurrection, but also the strongest voice against American intervention. Until the day of his death, Martí warned his fellow revolutionaries to guard against possible US intervention in Cuba's war of independence. He was aware of the danger that the USA represented. He wrote: "I lived inside the monster and know its insides- and my weapon is the slingshot of David". Antonio Maceo was in line with Martí's ideas. Maceo stated: "It is better to rise or fall without help than to contract debts of gratitude to a neighbor so powerful".

Audiotext 2

Under the Platt Amendment, the US limited Cuba's sovereignty and turned it into a neo-colonial enclave. It legalized US military intervention. It assumed the right to seize part of Cuba's territory by leaving ownership of the Isle of Pines, which is the second largest island in the Cuban archipelago, to be decided by future treaty. This amendment limited Cuba's rights to enter into treaties with other countries and it forced Cuba to sell or lease a part of its territory for the establishment of naval stations. The US government warned that if the amendment was not accepted, there would be no Republic of Cuba.

Unit 2. One Hundred Hours with Fidel

Audiotext 3

Fidel, turned into a sort of reporter, receiving and transmitting news and public messages, is an exceptional witness to the formidable counter-coup given by the people and the Bolivarian Armed Forces of Venezuela that led to the reinstatement of the President of the Republic, Hugo Chávez Frías, after the fascist coup d'état of April 11, 2002.

Chapter 24 from the book One Hundred Hours with Fidel, is a thorough and truthful account of these events. It is also an approach to other transcendental issues in Latin America. These include: the struggles of the indigenous peoples; the progressive tradition among Latin America military; the ill-fated Free Trade Area of the Americas (FTAA); a profile of political personalities of the present and the history of Latin America; the failure of neoliberalism and the certainty that a better world is possible.

Unit 3. Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women. Introduction (Part I)

Audiotext 4

Marta Nuñez-Sarmiento is a Cuban sociologist who examines revolutionary Cuba from within. She is a full professor at the University of Havana. In her article, Professor Nuñez assesses the role and attitudes of professionally and technically trained women, asking to what degree their situation has changed due to the special period. In her research she blends macroeconomic data with women's own accounts.

This article was published in the journal *Socialism and Democracy* Vol.15, No.1 Spring-Summer 2001, New York, USA.

Unit 4. Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women (Part II)

Audiotext 5

Cuban women became very creative during the special period. Here's a list of some alternative activities women have engaged in to earn a second income. The activities include, among others, renting rooms; cooking and selling food; sewing or knitting; raising chickens and selling eggs; typing documents; and working as part-time university teachers.

Unit 5. Cuban Strategies for Women's Employment in the 1990s: a Case Study of Professional Women (Part III)

Audiotext 6

Women in the sample feel that in the past forty years Cuban men have learned to respect women more, and that this has to be understood in the following terms. Women are more respected because they work and earn salaries. This has made them more independent. Moreover, in present Cuban society, some husbands earn less than their wives and some men are subordinate to women managers. Additionally, just like men, women have the opportunity to be trained in their professions and to practice them. Another reason women command more respect now is that they no longer tolerate violent acts by men.

Cuban women's participation has increased in practically all spheres of society, not only within Cuba but in internationalist missions as well. Today our women receive recognition at home, in their communities and abroad.

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