

Perspectives on Biological Communication By Richard Duree

Abstract:

State dependent memory or state-specific learning records not simply a report of actual events. Included in the memory are the emotions, feelings, related memories and connected muscular patterns and reflexes experienced while experiencing an event. Classical biochemical cellular communication is but one type of epigenetic (over genetic) influence on cellular activities such as growth and differentiation. New research exposes the role of integrins and connective tissue as information pathways for cellular communications that are simultaneously mechanical, vibrational or oscillatory, magnetic, energetic, and electronic. This informational network connects every cell in the body.

Davis-Duree reflexes will be used to alter state dependent stress stored in the enteric area, or the second brain in the gut.

Years ago, researchers discovered that the emotional state we are in when learning takes place becomes an integral part of that learning. We call this type of memory state dependent memory or state-specific learning. Candace Pert's discovery of the "molecules of emotion" shows how all informational substance (ligands) related function, such as cellular communication and control, immune system function including allergic responses and inflammation, occurs as a sophisticated memory system handled primarily by our emotional brain, via the hypothalamic limbic connections.

Due to these hypothalamic limbic (emotional brain) connections a positive or negative emotional reaction or "state" triggers a corresponding flood of state specific informational substances. Because learning and memory are emotional-cognitive functions, the neural pattern, imprint, script, or "structure of knowledge" (to use Jean Piaget's term) of a specific learning event includes in its content the memory patterns of those emotional informational substances prominent in the body at the time of that learning.

Thus the emotions, feelings, related memories and connected muscular patterns and reflexive reactions experienced while learning something becomes part of the learned biopattern. When we exercise that learning in the form of some type of internal or external perception (looks, smells, sounds, tastes, feels like), even years later, the same learned biopattern will activate, informational substances will be released on cue, for they are as much a part of the neural/glial information pattern as is conscious intellect and our body (structure and physiological responses), brain (emotional and psycho/physiological responses), and heart (feelings/physiological) respond accordingly.

The whole body is a learning and memory system, an organism. It is important to remember that when we are discussing biological subsystems that we are dealing with a living biosystem where all the parts are interconnected and interactive.

"I THINK therefore I am," said Descartes. He could have also stated: "I act, therefore I think."

Our concept that the brain was the center of mind has long been considered central to what makes us human. Now research suggests that our bodies and their relationship with the environment govern even our most abstract thoughts.

"Advocates of traditional accounts of cognition would be surprised," says Tobias Loetscher at the University of Melbourne in Parkville, Australia.

"They generally consider human reasoning to involve abstract cognitive processes devoid of any connection to body or space."

Until recently, the assumption has been that our bodies contribute only to our most basic interactions with the environment, namely sensory and motor processes. The new results suggest that our bodies are also exploited to produce abstract thought, and that even seemingly inconsequential activities have the power to influence our thinking. Traditional beliefs regarding cognition view human reasoning as a series of abstract processes occurring in the brain that are devoid of connection to one's body or the external environment. This view has been increasingly challenged recently in the scientific community. Dr. Loetscher suggests that even our most abstract thoughts do not take place in our brains alone. Our most abstract thoughts are governed instead by our bodies and the relationship between our bodies and the world around us. In this more recent view, the mind and body work together, neither having primacy over the other. In fact they are simply parts of a totally integrated biosystem.

In the work I have been involved in for the past 35 years I have begun to explore our encultured self and the structures of our personal life metaphor and their affects on our health and wellbeing. The very foundation and framework of our world view, self-image, mind set, faith, and belief are culturally and experientially determined. In order to learn how to rescript patterns in our own lives, and use this awareness to assist others in rescripting theirs, we have become aware of how many of these patterns get embodied. How did I learn that this particular way of experiencing a scene in life that causes stress or pain? Who and what caused a particular scene to

be written into the script of my life? The first awareness comes from learning that we are indeed dealing with patterns. Some patterns, or scripts, were inherited from our genetic past, the form and shape of our bodies and the way in which we process many forms of reflex and sensory awareness. Other plot developments are written into the script in response to our unique interpretation of the environmental experiences we have had from conception forward. The feedback from the internal and external responses to these environmental signals alters how we grow and what we connect together.

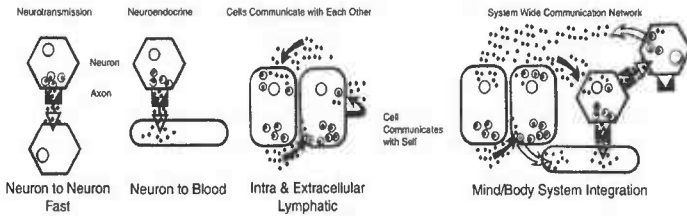
Once we become aware that our experience of life is a direct result of our interpretation of sensory inputs we can begin to cleanly observe conscious or subconscious responses and reactions to the perception of your (or your client's) personal reality: how we structure our interface with internal and external environmental signals and our unique assemblage of genetics (biology), sensory impressions (somatic reflexive memory) and thought structures (conscious and subconscious adaptive metaphors) are some of the base factors in our ability to manage stress, change and the cumulative effects of unmanaged stress on our biology.

That being said and science and biology being what they are what we are dealing with are people and people are all about relationships and story. Relationships are based upon communication. From the relationship between fields, cells, self, others and the environment, clear and balanced communication is essential to the process of health and well being.

Arguably the most important connection between cells lies in the different ways that they exchange information with one another. The precise pattern of our organs, in fact of our whole body and its dynamic functioning is possible only because cells communicate and cooperate. It is vital for cells to understand how to work together in a precisely coordinated manner. The cells must communicate to know when to divide, when to repair themselves, when to make molecules, when to move, and when to die.

So one way cells in different parts of the body communicate with one another is by using their sense of molecular "smell" as molecules that move from cell to cell, allow cells to coordinate their actions by sending informational substances back

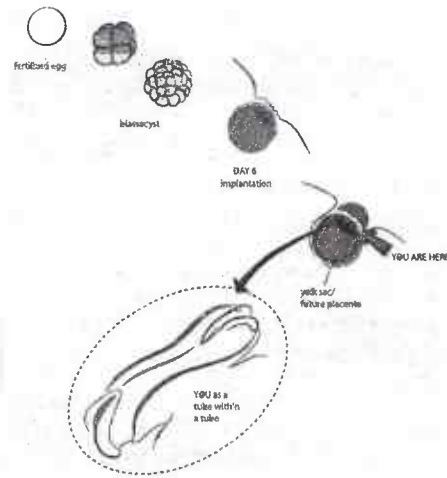
and forth. For instance, in a simple form of cell to cell communication, one cell will emit a signal, in this case a molecule or informational substance. This molecule will stimulate the outer covering or membranes receptor of the cell. This stimulation to the outer membrane will set up a chain reaction of molecular events that travels from the outer membrane all the way in many cases to the nucleus of the cell.



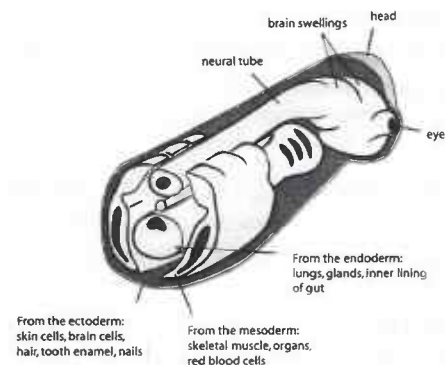
There is another basic structure underlying the connection between cells and their myriad manifestations, organs, muscles, bone, blood vessels, nerve, bioenergy systems and skin surfaces that we kinesiologists work with daily. In order to understand how these different systems get connected we have to look all the way back for a moment of fertilization. At the moment of fertilization, major changes happen inside the egg, the genetic material of the sperm and egg fuses and the egg becomes a complete cell. The cell then begins to divide, from this moment on the developing fetus experiences everything the mother ingests and every feeling, thought, and movement that she makes, these environment related epigenetic (over genetic) influences have a direct effect on the development of the fetus including brain development.

Over about five days, the single cell body divides four times, to produce a ball of 16 cells. This ball of cells, known as a blastocyst and looks like a fluid filled balloon. It is at this phase when the embryo implants into the mother's uterus. Around the second week after conception, the blastocyst has embedded itself with one part of the ball embedded in the side of the uterus. What happens next is the same for all animals whether fish, reptiles, or mammals. All organs can be traced to one of three layers of tissue in the developing embryo. These three layers become known as the germ layers. Significantly the three layers form the same structure and every species. Every heart of every species originates from the same layer. Another layer

gave raised every brain of every animal. No matter how different species look as adults, as tiny embryos they all go through the same stages of development.



The names of these three layers are derived from their position: the outer layer is called ectoderm, the interlayer endoderm, in the middle layer of the mesoderm. Ectoderm forms much of the outer part of the body (the skin) and the nervous system. Endoderm, the inside layer forms many of the inner structures of the body, including our digestive tract and numerous plans associated with it. The middle layer, the mesoderm, forms tissue in between the guts and skin including much of our skeleton and arm muscles. Whether the body belongs to a salmon, dog, chicken, frog or a mouse all its organs are formed by endoderm, ectoderm, and mesoderm.



As mentioned previously development the mammalian embryo has three distinct layers: ectoderm (external layer), endoderm (internal layer) and in between those two layers the middle layer or mesoderm.

Parenchyma

The parenchyma are the functional parts of an organ in the body. This is in contrast to the stroma, which refers to the structural tissue of organs, namely, the connective tissues. The parenchyma, of most organs is of ectodermal (brain, skin) or endodermal origin (lungs, gastrointestinal tract, liver, pancreas). The parenchyma of a few organs (spleen, kidneys, heart) is of mesodermal origin.

Examples include:

Organ Parenchyma

kidney	nephron
lungs	alveoli, respiratory bronchiole, alveolar duct and terminal bronchiole
spleen	white pulp and red pulp
brain	neuron, glia
liver	hepatocyte
heart	myocyte

The stroma of all organs (all parts of the organ that are not organ specific in function) is of mesodermal origin is the same substance that is the supporting framework for every cell in the body which typically consists of connective tissue made from collagen.

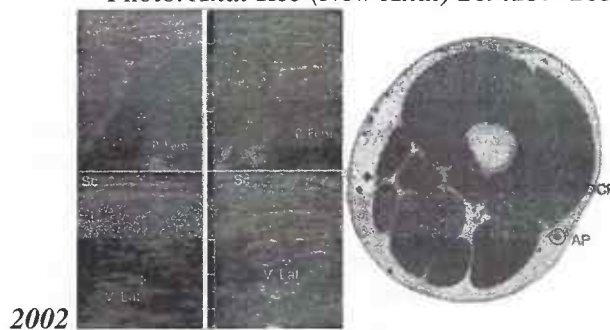


Peter Gascoyne and Ron Pethig, Albert Szent-Györgyi

In 1981 a collaboration with Peter Gascoyne and Ron Pethig, Albert Szent-Györgyi demonstrated that the protein, collagen, acts as semiconductor in biological systems where water is also present. Collagen is the most abundant protein in the world and is the main component of a tissue that has always fascinated me: the connective tissue. This is

the stroma material that forms the bones, ligaments, tendons, cartilage and the coverings of the bones and muscles known as fascia. The fascia forms the largest system in the body as it is the system that touches all of the other cells and systems. It can be described as the construction and communication fabric of the animal body. Alfred Pischinger, Hartmut Heine and their colleagues in Germany referred to this living matrix as the “ground regulation system” and the key to health and disease. To illustrate one aspect of this body wide information system we can look at a publication by Helene m. Langevin and Jason Yandow titled *Relationship of Acupuncture Points and Meridians to Connective Tissue Planes* they hypothesize that the network of acupuncture points (AP) and meridians can be viewed as a representation of the network formed by connective tissue. They propose that the anatomical relationship of acupuncture points and meridians to connective tissue planes is relevant to acupuncture’s mechanism of action and suggests a potentially important integrative role for connective tissue. Over 80% of classical acupuncture points fall on facial cleavage lines (AP). These areas are more conductive than control points (OCP).

Photo: *Anat Rec (New Anat) 269:257–265,*



The entire connective tissue living matrix is simultaneously a mechanical, vibrational or oscillatory, magnetic, energetic, electronic, and informational network. We now know that the cellular matrix is connected, across the cell surface, with the connective tissue system or extracellular matrix. Recently a whole class of cellular ‘trans-membrane’ linking molecules, or ‘integrins,’ has been discovered.

As was stated earlier YOU started life as a single cell. Now you are made up of somewhere between 40-60 trillion of these individuals. Every day billions of these cells die and are replaced. And if you hurt yourself, billions more cells spring up to repair broken blood vessels and make new skin, muscle or even bone. Even more amazing than the staggering number of cells, though, is the fact that, by and large, they all know what to do - whether to become skin or bone and so on. The question has been, how?

Until recently, the focus was all on "smell": that is, on how cells respond to chemical signals such as neurotransmitters, growth factors and other ligands (informational substances) bonding with the cell surface and their epigenetic affects. Biologists thought of cells as robotic automatons that blindly followed the orders they were given by this biochemical information. In recent years, however, it has started to become clear that the sense of touch is another epigenetic factor and is vital as well, allowing cells to work out for themselves where they are and what they should be doing by reading the stresses, tensions and textures around them.

What is emerging is a far more dynamic picture of growth and development, with a great deal of interplay between cells, genes, our body's internal and external environments plus our interpretation of these sensory inputs.

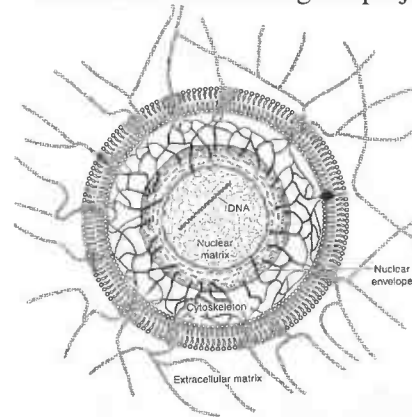
While it was clear that physical forces do play a role - for example, astronauts living in zero gravity suffer bone loss - until recently there was no way to measure and experiment with the tiny forces experienced by individual cells. Only in the past few years, as equipment like atomic force microscopes has become more common, have biologists, physicists and tissue engineers begun to get to grips with how forces shape cells' behavior.

"What's surprising is not that there are tactile differences between one tissue and another," says Discher. After all, doctors rely on such differences every time they palpate your abdomen. "What's surprising is that cells feel that difference."

The details of how they do this are now emerging, most cells other than blood cells, parenchyma, live within the fibrous extracellular matrix or stroma consisting of connective tissue made from collagen.

Each cell is linked to this matrix by proteins in its membrane called integrins, and the cell's internal protein skeleton is constantly tugging on these integrins to create a taut, tuned whole. "There's isometric tension that you don't see," says Ingber. This is another of the areas in which much of kinesiology operates. In practice, this means changes in external tension - such as differences in the tone of muscles, stiffness of the matrix, or the everyday stresses and strains of normal muscle movement - can be transmitted into the cell and ultimately to the nucleus, where they can direct the cell's eventual fate. Even relatively mild stresses make a big difference. Even small differences in forces can influence development.

Illustration shows integrins projecting from cell.



To understand how this signaling system works we need to be aware of the role of these integrins - tiny projections emerging from each cell, that act like mechanical sensors, mini-transmitters and receivers. The "integrins" are protein molecules that traverse the cell membrane and they form a direct physical connection between the extracellular matrix including connective tissue and the cells cytoskeleton, intracellular and nuclear matrices. Signals from the cells are transmitted to the connective tissue and from the connective tissue to the cells. This mechanism brings information instantaneously from the senses, mind (conscious and subconscious), meridians and all other body systems into each cell of your body.

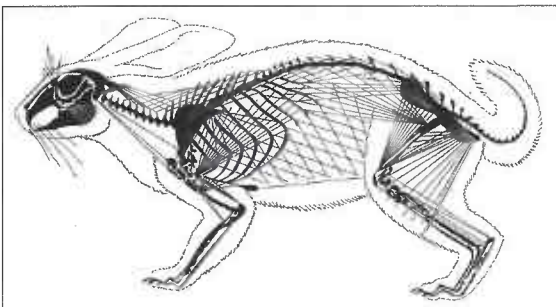
In 1969 Mark Bretscher at the Medical Research Council Laboratory of Molecular Biology discovered that one of the proteins in the membrane of red blood cells extends across the cell surface,

essentially connecting the inside of the cell with the outside. His research on this subject was reported in several scientific journals in 1971.

Dr. Donald Coffey at Johns Hopkins School of Medicine studied the nuclear matrix and its interconnections with both the DNA and with molecules that extend across the nuclear envelope and connect to the cytoskeleton. What this meant was that we could now trace the continuity inward from the extracellular matrix and connective tissues, across the cell surface via the integrins and related molecules first described by Bretscher, throughout the cell cytoplasm via the cytoskeleton, and across the nuclear envelope to the genetic material. In 1991, the same group produced an inspiring report on the way signals propagate through this matrix, which they termed a tissue tensegrity matrix system. Tensegrity is defined as a continuous tensional network (called tendons) supported by a discontinuous set of compressive elements (called struts).

The 1991 report by Pienta and Coffey gave precise language and experimental validation to the transfer of energy and information through the living matrix:

Cells and intracellular elements are capable of vibrating in a dynamic manner with complex harmonics, the frequency of which can now be measured and analyzed in a quantitative manner...a tissue-tensegrity matrix system...is poised to couple the biological oscillations of the cell from the peripheral membrane to the DNA...[and in the other direction]. [Words in brackets added by the author]



The new research on epigenetics is teaching us that the way we think about ourselves and even the words we use and the words used by the people around us can cause changes at the level of our DNA molecules. It is said that the DNA in every cell in your body is listening to every word you say and

hear. From the ideas expressed above, one can see that the vibratory living matrix probably plays a key role in delivering the vibrations of our words and thoughts to every DNA molecule in our bodies.

Donald Ingber

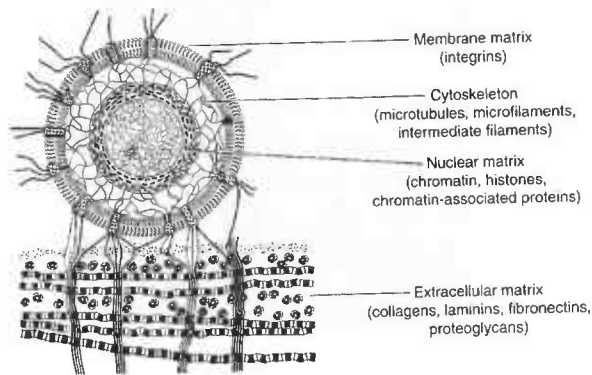


Donald Ingber's work has involved showing how tissue, cellular, and nuclear architecture can be described as tensegrity systems.

Tensegrity also accounts for the fact that inflexibility or shortening in one tissue influences structure and movement in other parts. While a kinesiologist may focus on improving muscle balance, flexibility and/or mobility of a particular part of the body, the effects can and do, spread to other areas. This is, in part, due to the tensional integrity of the system, but it is also due to the fact that the tensional system is a vibratory continuum. This can be demonstrated with a tensegrity model by plucking one of the tendons. This will cause the entire network to vibrate.

Since the living tensegrity network is simultaneously a mechanical and a vibratory continuum, restrictions in one part have both structural and energetic consequences for the entire organism. Structural integrity, vibratory integrity, and energetic or informational integrity go hand in hand. One cannot influence the structural system as we do as kinesiologists without influencing the energetic/system, and vice versa.

We can use the downstream effects of the mechanical signal generated by physical manipulation to modulate signal transduction to and within the cell. Modification of connective tissues stresses and tensions therefore may have important biomechanical, vasomotor and neuromodulatory effects as observed with Chapman (neurolymphatic), Bennett (neurovascular), and Davis-Duree reflexes (N.E.P.). We will now work with Davis-Duree enteric related reflexes used to help change state dependent stress reactions in the gut area related to perception.



Answer these questions before proceeding to following pages.

3 Questions

List 3 situations in your life where you would like to make change. Be sure that these are issues that affect your enteric (gut) energy. Then in a, b and c, list 3 ways your life would be different if you changed this reaction. Make sure that these changes are stated in physical terms.

1.

- a.
- b.
- c.

2.

- a.
- b.
- c.

3.

- a.
- b.
- c.

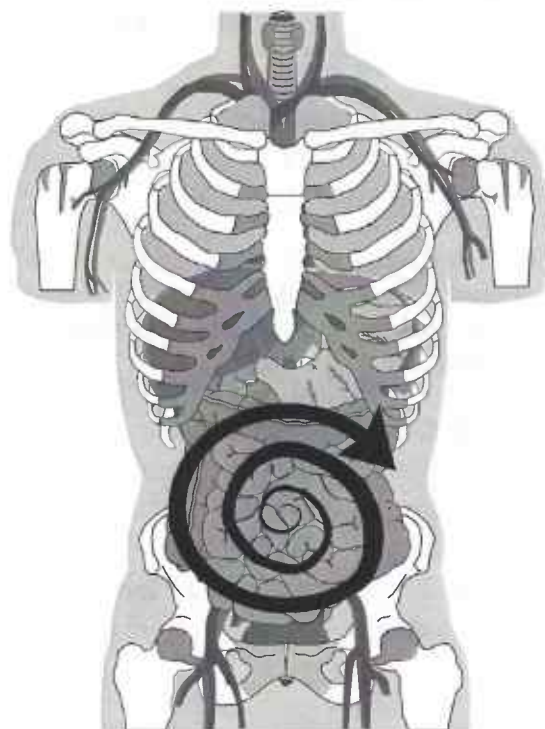
N.E.P. Enteric Release Technique

Have you ever experienced a Gut Feeling? Who hasn't? Without a doubt if you are alive you gut talks to you from time to time. When there is conflict between the brain in the head and the brain in the gut, (enteric nervous system) the gut usually wins. When clients come in with a wide range of symptoms from depressed states, fear, bowel issues, anxiety, and just strange feelings or moods that they attribute to the gut area, start the N.E.P. enteric release technique.

1. Go to the area around the navel and check by a shock tap and test...
2. If you get an indicator change start testing slowly around the navel spiraling out in the direction of the illustration on the next page.
3. When you get an indicator weakness press into the area and hold the area on top of the upper trapezius muscle.
4. Hold the two points and dialogue with the client about the issue until the pulse comes up in the ganglion, the area below your hand softens, or the client tests that you have held the point long enough.
5. Continue this process until there are no more reactive points in the abdominal area on that issue.
6. Go to the area around the navel and check by a shock tap and test.
7. If you get an indicator change start testing slowly around the navel spiraling out in the direction of the illustration on the next page.
8. When you get an indicator weakness press into the area and hold the area on top of the upper trapezius muscle.
9. Hold the two points and dialogue with the client about the issue until the pulse comes up in the ganglion, the area below your hand softens, or the client tests that you have held the point long enough.

10. Continue this process until there are no more reactive points in the abdominal area on that issue

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Richard Duree
Neuroenergetic Psychology Institute
Office Address:
349 East Main Street Suite 1A
Ashland, Oregon USA 97520
Phone 541-899-7209

Mailing Address:
P.O. Box 1563
Jacksonville, OR USA 97530
E-Mail: neurogenics@usa.net
Website: www.neuroenergetic.com

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Richard Duree

Is an internationally known kinesiologist (Master Kinesiologist, IASK) educator, author, lecturer and counselor, he served for six years as an executive board member and the Research Director for the International Association of Specialized Kinesiologists (IASK) and is currently serving on the Advisory Board. He is a Trustee Neuroenergetic Psychology Institute and co-creator of the Neuroenergetic Psychology System, N.E.P., Structural Kinesiology, Phased Reflex System and the Advanced Professional Practitioner Programs with Andrew Verity, N.D. During his 35 years in the field of specialized kinesiology Richard has also served as the head of Research and Development for Dr. John Thie, creator of the Touch for Health Program. He acted as an Instructor Trainer for the Touch for Health Foundation with Shanti Duree and co-creator of the One Brain System Gordon Stokes. Richard also worked for many years with Olympic and other world-class professional athletes under the direction of Dr. Leroy Perry of the International Sports Medicine Institute, Los Angeles. At the Renaissance Clinic in Nassau, Bahamas, he researched the effects of muscle balancing on stress and aging under the direction of Dr. Ivan Popov, M.D. He has published numerous papers in kinesiology journals worldwide and contributed to numerous books on the subject including Touch for Health 2nd edition by Dr. John Thie, Staying Young by Dr. Ivan Popov, M.D. and Energy Medicine by Donna Eden and David Feinstein. Along with his partner Shanti he teaches various kinesiological programs at professional schools of natural healing worldwide. When not on the seminar circuit Richard maintains private practices in Santa Barbara California and Ashland Oregon USA.