2009-11

The ISCIP Analyst, Volume XVI, Issue 5

Cavan, Susan

Boston University Center for the Study of Conflict, Ideology, and Policy

http://hdl.handle.net/2144/11873

Boston University
Russian Federation: Executive Branch

By Susan Cavan

Waiting for the other shoe

Russian political life seems a mash of contradiction and mixed metaphor at the moment, particularly when juxtaposed with the 1989 “fall of the wall” commemorations. At that time, the leader of the Soviet Union was the head of a one-party state, who somehow recognized that the aggregation of propagandistic slogans extolling the merits of the Soviet system (not to mention the economic drain of the system) could not withstand the pressure of realism just beyond its borders. Events in modern Russia, however, have caused the one-time Soviet leader to warn of the dangers looming when a regime’s PR can’t approximate its reality. Nonetheless, the current Russian president continues to declare electoral fraud a “precise reflection of political forces.” (1)

Following the October 16 elections in Russia—the results of which were met with a walk-out by the opposition parties in the Duma—former Soviet President Mikhail Gorbachev declared, "In everyone's eyes, the elections turned into a mockery of the people and showed a deep disrespect for their voices. … The party of power gained the result it needed by discrediting political institutions and the very party itself." (2)

It is not exactly the “mishandling” of electoral results per se that has created this public discomfit (perhaps some vote manipulation is to be expected), but rather the consequential walk-out by deputies, perhaps at the encouragement of the Kremlin, has called attention to the vacancy of the process and disregard for the underlying principle of elections, in favor of the perfunctory nod to form: elections are held, the party of power wins, and the results accord with all the publicized
opinion polls shown on state-controlled television. This may not be the democracy envisioned in 1989, but times have changed. Or have they? President Medvedev, whose own election owes much to Russia’s carefully controlled political and media spectacles, has grown more and more vocal as a putative reformer over the course of his eighteen months in office.

In his November 12 address to the Federal Assembly, President Medvedev emphasized the need to modernize Russia, most pointedly the economy: "Instead of a primitive economy based on raw materials, we shall create a smart economy, producing unique knowledge, new goods and technologies, goods and technologies useful for people." (3) Management of the economy has been fundamentally the purview of the Russian government, and as such, Medvedev’s remarks may reveal tension with or imply criticism of Prime Minister Putin. Nonetheless, there does not appear to be another personality to rival Putin who might lead the government.

Medvedev’s address also noted a malaise more prevalent than Russia’s economic foundation: "Instead of an archaic society, in which leaders think and decide for everybody, we shall become a society of intelligent, free and responsible people." (4)

The president’s address to the Federal Assembly echoes similar critiques laid out in a Manifesto—a call for dialogue in preparation of his address to the Federal Assembly—published in August. (5)

In the Manifesto, as well as in various other expressions this year, Medvedev has identified certain key hobgoblins to real reform in Russia: Corruption, official and otherwise; Criminal activity, including drug smuggling; the undermining of state structures by Oligarchs’ dogged pursuit of self-interest (and, in general, Oligarch ties to state businesses); and even the overly close connections between leading state officials and large state industries.
As for strictly political critiques of current day Russia, Medvedev’s Manifesto was clear: “Democratic institutions have, on the whole, been formed and stabilized, but their quality is very far from ideal. The civil society is weak and the level of self-organization and self-government is low.” (6) And yes, he should know. It was exactly the weakness of these institutions that allowed his rise from “First Deputy Successor” to President.

Medvedev has been holding out the hope, however, the he is a reformer. He not only can identify the problems besetting Russia’s leadership, he has a vision for a better Russian political future: “As in the majority of democratic states, the leaders in the political struggle will be parliamentary parties that periodically replace each other in power. Parties and coalitions thereof will form the federal and regional organs of executive power (not the other way around) and nominate candidates for the post of head of state and regional and local government leaders. They will have long experience of civilized political competition. And of responsible and meaningful interaction with voters, of interparty cooperation, and of seeking compromise options for solutions to the most acute social problems.” (7)

There has been a building anticipation this year that the Medvedev-Putin diarchy would engage in a political scuffle, as Medvedev maneuvered for more authority to enact some type of reforms. Medvedev chooses rhetoric that feeds this expectation (even if not consistently), and his advisers publicly posit the means of Medvedev’s success in the face of a Putin-centric siloviki in control of the major levers of power. (8) For many months, it had appeared as though the battleground would focus on corruption, particularly within the offices of state officials – the apparatchiki. The truly taxing issue of just who would be investigated does not yet seem to have been broached as the corruption probes bog down in the murk of ownership of the process: Who should investigate? Who would oversee the investigators? Progress, in the form of prosecutions of leading officials in high-level offices, has not materialized.
In the wake of the October 16 elections, and, in particular given the president’s defense of fraud in the electoral process as nonetheless producing a legitimate result, Medvedev’s reform credentials continue to fade and his inaction disappoints a populace whose expectations he seemed determined to raise.

No wonder Putin has been so quiet of late. He gains nothing by stepping into this spectacle of rhetoric freed from action.

Source Notes:
(2) “Gorbachev raps Russia's "mockery" of democracy,” 19 Oct 09, Reuters via Johnson’s Russia List (JRL), 2009-#192, 19 Oct 09.
(4) Ibid.
(5) The ISCIP Analyst, Executive Branch, R-E-S-P-E-C-T by Susan J. Cavan, Volume XVI, Number 1, Part I (17 September 2009).
(6) Article by President of the Russian Federation Dmitriy Medvedev, "Forward, Russia!" Gazeta.ru, 10 Sep 09 via JRL, 11 Sep 09, 2009-#169.
(7) Ibid.
Communists seize the moment in an attempt to drive a wedge into the Putin-Medvedev partnership

Russia’s Communist Party leadership declared last week that they prefer the politics and policies of current President Dmitri Medvedev to those of his predecessor, current Prime Minister Vladimir Putin. (1) Although the party had not given any indication that there was an impending announcement or shift in policy, the Communists have been unusually outspoken in recent weeks.

Communist Party leader Gennady Zyuganov is considered one of the main instigators of last month’s Duma walk-out in protest of the widespread ballot tampering and electoral fraud that resulted in more than 7,000 United Russia party victories across the country. 135 members of the 450-seat Duma left during a meeting of the lower house of parliament. (2) The Communists, who claim to have suffered the greatest vote loss, due to alleged fraud in the contested elections, (3) also staged protests in cities across the country. Since October some have raised questions about why the parties involved chose this election, at this time, to take a stand against the government and United Russia.

In response, more than 150,000 members of the Communist Party participated in marches around the country on November 7th to commemorate the anniversary of the October Revolution. The marches themselves are a form of anti-government protest. In 2005 Putin designated November 4 as a day of Russian National Unity, which is marked by a re-enactment of the Red Square parade that took place on November 7, 1941 to bolster the Soviet forces’ morale in the war against Germany. (4) This year, the marchers expressed anger about the
government’s handling of mortgage fraud, widespread unemployment, and corruption at all levels of the public sector. More than anything else, however, protesters were eager to discuss their frustration with Putin and his handling of the government, but surprisingly, not with Medvedev. As one protester explained, “We consider Medvedev and Putin to be parts of one whole,” but “when Medvedev declared priorities that were so close to ours, we could not fail to appreciate it.” (5) A banner that read, “Putin is the main hurdle for the progress of Russia” articulated the party-leadership approved theme of the marches. (6)

Following the November 7 marches, it has become apparent that the Communist party’s efforts are part of a wide attempt to drive a wedge between the President and the Prime Minister. When Zyuganov spoke at his party’s general assembly last week, he told the assembled Communist Party members that “the so-called tandem government of Mr. Putin and Mr. Medvedev was collapsing.” Zyuganov also offered the current President the support of the opposition “if he ever decides to go on a real but not declarative struggle for those principles that he stands for.” (7) The rumored rift between Medvedev and Putin may be exacerbated further when members of the opposition, especially Russia’s second largest and best-organized party, begin to take sides. Even though the Communists’ goals, which include mass nationalization, progressive income tax and a state monopoly on alcohol production and sales, (8) are not in line with Medvedev’s more liberal-leaning policies, it is likely that choosing a side early is the party’s way of ensuring greater presidential support if he wins the anticipated Presidential election showdown in 2012. Given the “controlled” element in Russian elections, demonstrating strength well before the vote provides a greater likelihood of success. The Communists currently control 57 seats, or approximately 13 percent of the Duma.

Barring any unforeseen catastrophe, Russia’s next President likely will be either Putin or Medvedev. Even with the slight (and temporary) dip in approval ratings at the height of October’s elections scandal, Putin and Medvedev’s “trust” ratings
hover around 70 percent and 60 percent, respectively. (9) For his part, the President has denied the existence of any discord between himself and Putin. In a recent interview with the German publication Der Spiegel, Medvedev said that the two men would “sit down and discuss which one of us is going to run in the election – so that we don’t interfere with each other” but denied that that such a meeting would determine “who the next president will be.” (10) In September, Putin said that the two men would “come to an agreement because we are people of one blood and one political view.” (11)

Beyond the obvious political maneuvering, the Communists' recent actions are interesting because they suggest that the party’s leadership may believe that the time is right to seize any opportunity to advance their philosophy. The global economic crisis had a particularly devastating effect on Russia’s commodities-based system, which has prompted a rise in nostalgia for a time when “the jobless rate was zero, food was cheap and social safety was high.” (12) This is clearly not just a Russian phenomenon; a BBC World Service survey from October found that 23 percent of the people surveyed across 27 countries believe that free market capitalism is fatally flawed and only 11 percent think that the current system works well. (13) The citizens of Russia, however, have even more to say on this subject. Those polled not only extolled the virtues of a more socialist system, but also indicated that they “would like their government to be more active in owning or directly controlling their country's major industries.” (14) With these trends in mind, it is entirely possible to believe that the Communists are working to capitalize on the ever more popular feeling that the disintegration of the USSR was a mistake.

Source Notes:


(4) "Defiant Communists mark Russian Revolution anniversary," American Foreign Press, 7 Nov 09 via http://www.google.com/hostednews/afp/article/ALeqM5jbXxqzMv7GM1c3a4h3SR5cfHbWWQ. Last accessed 8 Nov 09.

(5) "For Russia's Communists, Ousting Putin is a Priority," Ibid.

(6) "Russian communists flirt with Medvedev," Ibid.

(7) "For Russia's Communists, Ousting Putin is a Priority," Ibid.

(8) "Russian communists flirt with Medvedev," Ibid.

(9) "For Russia's Communists, Ousting Putin is a Priority," Ibid.

(10) Georg Mascolo, Christian Neef, and Matthias Schepp, "The Fall of the Wall United Us Again," Spiegel Interview with Russian President Dmitry Medvedev, 8 Nov 09 via http://www.spiegel.de/international/world/0,1518,660114-3,00.html. Last accessed 8 Nov 09.

(11) "Medvedev: Hand-Picking the Next President is 'Funny,'" The Other Russia, 8 Nov 09 via http://www.theotherrussia.org/2009/11/08/medvedev-hand-picking-the-next-president-is-funny/. Last accessed 8 Nov 09.


(14) Ibid.
Russian Federation: Foreign and Security Issues

By Fabian Adami

START-Iran linkage?

On December 5, 2009 the START I Treaty, signed in January 1991, will expire. The United States and Russia both have repeatedly expressed the desire either to extend or replace the agreement as soon as possible. In July 2009, President Barak Obama and President Dmitri Medvedev agreed on and signed the outlines of a new treaty, according to which both sides will reduce their deployed warhead numbers to below 1,700, with cuts to be achieved within seven years. (1) Since July, there have been two further sets of high-level talks between Russia and the US.

First, in mid-October, Secretary of State Hillary Clinton met with Foreign Minister Sergei Lavrov. Following their discussions, Lavrov claimed that although significant progress had been made and “consensus” reached on a number of important issues (2), the two sides still have major disagreements.

Then, between 28th-29th October, US National Security Advisor General James Jones traveled to Moscow to continue talks with Lavrov. According to press reports after their meetings, it was in these sessions that the Foreign Minister explained two issues on which Russia is at odds with the United States: Moscow wants to link reductions in offensive and defensive weapons, (3) and table the discussion of “non nuclear strategic armaments,” (4) read ICBMs tipped with conventional munitions. The US apparently is considering assenting to the latter discussion. Russia opposes such weapons, because it believes that any imbalance in the field of strategic launch platforms is just as destabilizing to international security as a warhead imbalance. (5)
In order to ensure that these two issues do not become a major stumbling block preventing a new treaty, the United States and Russia are seeking an “executive agreement” (6) for the short term. START I specifies that verification and inspection teams must leave the signatory countries when the treaty expires, potentially leaving the two largest atomic arsenals in the world unmonitored, something which neither the Kremlin nor the White House claim would be an acceptable outcome.

Lavrov has noted that the United States is taking Russia’s “concerns” on the aforementioned issues “into account” and is preparing “counter-proposals.” (7) Russia already has won one victory with the US abandonment of the European component of missile defense. Moscow may believe that it can gain more concessions because Washington, preoccupied as it is with the Iranian nuclear issue, might be willing to make further significant compromises in order to secure Russian acquiescence to sanctions in the UN Security Council, should they become necessary. Moscow obviously believes it has significant influence over Iran and is trying to sell its vote as expensively as possible.

**British-Russian talks**

On November 2, David Miliband (Britain’s Foreign Secretary) traveled to Russia for talks with Foreign Minister Lavrov. Miliband’s trip constituted the first time such a high level minister had been to Moscow since 2004. Relations between the UK and Russia have become steadily worse since the Litvinenko assassination in 2006, with Russia refusing to extradite Scotland Yard’s prime suspect (Andrei Lugovoi), closing down British Council offices across the country, demanding the extradition of Boris Berezovsky, and engaging in “tit-for-tat diplomatic expulsions” with Britain. (8) As was to be expected (the 3rd anniversary of Litvinenko’s death is approaching) Miliband raised—and was rebutted on—the subject of Lugovoi’s extradition, (9) but otherwise attempted to focus on matters of mutual interest.
Prior to his departure for Moscow, Miliband expressed a desire to restart relations with Russia, noting that while the two countries do not always “see eye to eye,” they “share the same global challenges,” ones that need to be worked on “together.” (10) It appears, however, that Whitehall’s continued insistence on Lugovoi’s extradition is an obstacle that cannot be overcome. The talks produced few concrete results, with the two ministers simply signing several joint declarations agreeing to cooperate in Afghanistan, (11) to adhere to the Nuclear Non-Proliferation Treaty (12), to urge Iran to respond favorably to the IAEA’s proposals on nuclear fuel, and to work as part of the quartet for a Middle East peace settlement. (13)

The United Kingdom is scheduled to hold Parliamentary General Elections no later than June 2010. It is entirely possible that Russia is simply biding its time until then, in the hopes that a new government, whether Labor or Conservative (but more likely the latter), will be more pragmatic and drop the Lugovoi extradition request in favor of resuming normal relations. If this is the case, the Kremlin is likely to be disappointed: a Tory government touting itself as tough on law-and-order is unlikely to change Britain’s tune on so serious a subject as a nuclear assassination on its own soil.

**UAV’s for Border Service**

On 19th October, the FSB announced that a company named ZALA Aero Pilotless Systems had won the contract to supply the Border Service with unmanned aerial drones. The company will supply a mixture of fixed wing and rotary powered drones, able to carry a variety of sensors, including still cameras, color video cameras, and thermal imaging systems. (14) The aircraft will be able to transmit images over long distances, and will be used to prepare “special operations by day and night.” (15) What is not clear at the time of writing is whether these aircraft will be armed in the same way as the US Predator drone (and therefore capable of offensive operations and so-called targeted killings), or
whether they will be used simply to patrol and monitor Russia's porous, lengthy and inhospitable border regions.

Source Notes:
(3) “Russia: Clinton, Lavrov Views ‘Coincide’ on Iran, Differ on START, MD Report by Aleksandr Gabuyev: ‘We Are Not Requesting Anything of Each Other on Iran. Positions of Sergey Lavrov and Hillary Clinton Coincide Completely on All Nuclear Issues in Regard to Tehran,’” Kommersant, 23 Oct 09; OSC Translated Text via World News Connection.
(5) Ibid.
(11) “Analysis: Miliband Visits Russia to Thaw Frosty Ties, Yet Differences Remain,” Xinhua, 2 Nov 09; OSC Transcribed Text via World News Connection.
President Medvedev focuses on defense industry
The Russian armed forces are making progress in instituting major reforms. According to President Medvedev, the military plans to complete organizational reforms by the end of the year and to equip the armed forces with modernized equipment and weapons by 2012. (1) Although the armed forces are making progress, a weak Russian defense industry, including an exodus of defense specialists, may impede the pace of future progress.

On October 26, Russian President Medvedev held a meeting on defense industry development in Moscow. During his opening comments, the President articulated concern with the poor performance of the Russian defense industry, stating, “How can we plan strategy and tactics if our arms are inferior?” (2) The impetus for his comment were a number of “serious issues” (3) raised during a conference with military generals following Zapad 2009 (a strategic military exercise held in late September). (4) President Medvedev further identified six
issues the military-industrial complex must address in order to meet the nation’s security needs. They include obtaining a greater return on defense investment, controlling pricing, improving laws regulating state defense procurement, boosting investment in relevant new technologies, executing an industry strategy that provides modern arms to the reorganized armed forces and bolstering the industry’s arms export business. (5)

The President’s goal for the meeting was to analyze “prospects” for development, to “examine specific measures” to make the industry more competitive and to enable the development of new and innovative weapons for the armed forces. (6) The Russian President’s direct involvement in the defense industry comes at a time when nearly a third of all defense enterprises are reporting negative financial indicators or are on the verge of bankruptcy. (7) Not only is the industry plagued with serious financial problems, it also faces significant productivity issues. According to Chairman of the Russian Public Chamber Commission for the Affairs of Veterans, Service Members, and their Families Aleksandr Kanyshin, “the labor productivity indicators [show] Russian defense companies are falling behind their foreign competitors in various areas by 5-15 times.” (8)

One striking example of the industry’s inefficiency centers on the research and development of the new Russian uniform. According to Russian Public Chamber expert consultant Vladimir Bogatyrev, “Many research and development works, which started in 1993, are dragging out, and there is no simultaneous development of about 60 elements of the new uniform. Thus, the deliveries to military districts have not yet begun.” (9) After waiting seventeen years for a new military uniform that still has not entered production, it is understandable why Russia’s military leaders are concerned.

To add to the list of industry woes, the sector also is facing a significant loss of specialists. According to Bogatyrev, “the pay in the defense industry is still lower than in civilian companies…[consequently] there is a steady massive outflow of
specialists, especially young ones.” (10) Bogatyrev further elaborated that the defense industry is rapidly aging and the average age of a Russian defense worker is approaching 50 years. (11) This trend is problematic not only for the defense sector, but for Russia as a whole. As Chairman Kanyshin points out, “the defense [industrial] complex accounts for around 70% of all Russian-made high-tech products and approximately 50% of [the] researchers.” (12)

Even if the defense industry were to increase salaries to attract new scientists and tech-savvy specialists, it might not be enough to remedy the shortfall. The “brain drain” phenomenon is not unique to the defense industry. It is a challenge the Russian scientific community is facing, as well. According to a recent poll, nearly 33% of all Russian university graduates earning a science degree would like to work abroad and only 2% of graduates want to work in their field. (13) To make matters worse, Russia is planning to cut 16.6 billion rubles from its 2010 Academy of Sciences budget. (14) These indicators point toward a very uncertain future for Russia’s innovative high-tech defense industry.

To address the challenges facing the defense industry, President Medvedev ordered the establishment of a ranking defense industry working group by December 1. (15) According to Deputy Prime Minister Ivanov, “the main purpose of the [working group for modernization and innovation development of the defense industry] is equipping the Armed Forces of the Russian Federation with contemporary armaments and military equipment.” (16) Until the group forms and makes substantive changes to the defense industry, one question remains. Will President Medvedev’s recent public interest provide the new working group with enough influence to modernize and reform Russia’s floundering defense industry?

Source Notes:
(1) “Russian president’s remarks at meeting on defence industry development,” President of Russia website, 27 Oct 09 via Lexis-Nexis Academic.
The thoughts and opinions expressed in this article are those of the author and do not necessarily reflect the official position of the United States Air Force, Department of Defense, or the United States government.

Russian Federation: Energy Politics

16
Poland's dilemma

In late October Poland’s gas monopoly PGNiG signed an agreement to increase natural gas purchases from Russia’s gas monopoly Gazprom from last year’s level of about 7 billion cubic meters to nearly 11 billion cubic meters a year through 2037. (1) In signing the supply agreement with Russia, Poland is taking a calculated risk. Although the country will rely increasingly upon Russian gas supplies in coming years as it transitions away from coal power generation, the Polish government may hesitate before endorsing a new contract with Gazprom. Last year PGNiG committed to reducing Poland’s dependence upon Russian imports to 40 percent by 2015. (2) That target will be hard to meet under the terms envisaged in the new agreement, wherein Russian gas volumes will make up about 80 percent of Poland’s total consumption. Even if Poland’s consumption increases to 18 billion cubic meters by 2015 as projected, Russian gas volumes still will comprise over 60 percent of Poland’s annual supply. (3) Moreover, it is unclear where Poland could secure the additional gas volumes, if not from Russia.

The new supply agreement comes at a moment of ticklish relations between the two countries. In September, as the Obama administration announced Washington’s withdrawal from a Bush-era missile defense program in eastern Europe, the Russian military launched a simulated nuclear attack on Poland and targeted Polish gas pipelines in war games conducted jointly with Belarus. (4) On a visit to Washington earlier this month, Polish foreign minister Radek Sikorski, sought “some strategic reassurance” from US and NATO that his country would be shielded from Russian aggression, a plea that a Russian parliamentarian called “absolutely unacceptable.” (5)

Nor are Polish security concerns confined to Russian military posturing. In the realm of energy, the resource flow is shifting in directions that threaten to leave
Poland vulnerable to Russian price and supply manipulations. In the two countries' original supply scheme, Poland occupied a key position in a gas transportation network that prospectively would stretch from Russia's northern Yamal peninsula through Belarus and Poland to end in Germany. The Yamal-Europe pipeline, jointly owned by PGNiG and Gazprom, came online in 1997 carrying gas from fields in western Siberia, but the line never reached as far as the Yamal peninsula, where Russia's largest gas reserves are located.

In 2007, Gazprom abandoned plans to build a second branch of the pipeline in favor of a new project, the Nord Stream pipeline, projected to carry Russian gas along the Baltic seabed directly to downstream markets in Germany, completely bypassing Poland. (6) This month Nord Stream cleared the last political hurdles to construction, when Sweden and Finland joined Denmark in approving the project. (7) The undersea pipeline is scheduled to come online sometime in late 2011 or early 2012. (8)

In Poland, the development of the Nord Stream pipeline project is seen as cause for alarm. Sikorski, at the time when he served as Poland's defense minister, characterized negotiations between Gazprom and its German partners as another Molotov-Ribbentrop pact, like the 1939 agreement in which the USSR and Nazi Germany colluded to divide up Poland. (9) Polish officials clearly are worried that once the country is no longer host to a conduit through which Russian gas must pass on its way to favored German markets downstream, Gazprom will not hesitate to cut off Poland's energy supply, should political tensions run high. Given Russia's recent war game scenarios, political antagonism seems all too imminent. Nevertheless, in recent weeks the Polish government has played down anxieties over what is increasingly seen as the inevitable progress of the Nord Stream pipeline. During a recent meeting with his Russian counterpart Vladimir Putin, Polish Prime Minister Donald Tusk remarked that the new pipeline was "not an important element of Russian-Polish relations," and is ultimately "an issue between German and Russian companies." (10) Tusk
even suggested that Poland could become a critical partner in the project, although he reiterated Poland’s strong preference for a reinvigoration of the Yamal-Europe gas route. With the onrush of momentum following the formal go ahead by Denmark, Sweden and Finland, Nord Stream does not face any serious obstacles from Poland, nor does Poland have any particular sway over its remote route. In the absence of a clear alternative, Poland will have to come to terms with a new energy supply dynamic during the 27-year period covered by the recent PGNiG-Gazprom supply contract, an arrangement that appears to give Russia a substantially magnified degree of leverage over its downstream customers. Poland’s supply of natural gas through 2037 depends upon the continued good will of Russia, something that country has yet to demonstrate.

Source Notes:
(3) Ibid.
(7) “Sweden and Finland clear Nord Stream plan,” The Financial Times, 6 Nov 09 Via (http://www.ft.com/cms/s/0/102d424c-cade-11de-97e0-00144feabdc0.html).


(10) “Russia & CIS Oil and Gas Weekly,” Interfax, 2 Sep 09 Via Lexis-Nexis Academic Universe.

Copyright Boston University Trustees 2009

Unless otherwise indicated, all articles appearing in this journal were written especially for Analyst. This article was originally published at http://www.bu.edu/iscip/digest/vol16/ed1605a.shtml.