



# PACK RATS'

# CHEESE

# BITS



CLUB CALL: W3CCX

MT. AIRY VHF RADIO CLUB, INC.

MT. AIRY VHF RADIO CLUB, "THE PACK RATS", PHILADELPHIA, PA. W3CCX  
NET FREQUENCIES: 50.150, 144.150, 222.125, 224.58/222.98, 432.110, 903.100, 1296.100 MHz  
AFFILIATED CLUB: AMERICAN RADIO RELAY LEAGUE ARNS

Meetings: Third Thursday of each month at 8:00 PM  
Southampton Free Library, 947 E. Street Road  
Southampton, Pennsylvania 18966

SCANNED TO PDF BY BERT, K3IUUV, 2013

VOLUME XXXVI

May 1994

Number 5

## THE PREZ SEZ

Our thanks to Al Katz, K2UYH, and Tom Dinyovszky, KB2AH, for a very interesting presentation on EME communications at our April meeting. Al presented a detailed historical account of the pioneering "amateur" work that has contributed to moonbounce becoming a practical communication mode for even modestly-equipped stations. Tom talked a little about his EME experiences as well and a homebrew 30 ft dish! Moonbounce is yet another area that amateurs have made very real contributions to the communications state of the art. The Packrats have been active on EME in the past with a club station and the first ever EME DX-pedition, to Columbia, South America activating HK1TL off the moon, giving K2UYH the fist Worked All Continents award on 432 MHz.

Well, the EME bug has bitten again - the W3CCX call sign will again be heard off the moon during the June 4th and 5th contest weekend with a 144 MHz EME station and possibly the higher bands. Pat, WB3DNI, and the various band captains have been making plans for the weekend at Camelback Mountain. The contest site is readily accessible, a reasonable drive from the Philadelphia area and perhaps the premier operating location from the Northeast, only second to the W2SZ Mt Greylock hilltop. There's lots of good DX to be worked from Camelback and an operation of this magnitude requires everyone's efforts. Mark the weekend on your calendar and talk to Pat, WB3DNI, to sign up!

May 14th is our Ladies night Dinner at the Mill Race Inn in Holland, PA. This is our chance to thank our XYL's for their patience and support of our hobby and to recognize those who have made outstanding contributions to the club during the past year. Please call Bruce, WA3YUE, immediately if you have not yet made reservations.

Our May meeting is ARRL night with guest speaker Tim Duffy, K3LR, our Atlantic Division CAC representative. Tim has been very active representing the concerns of the weak signal VHFer's, and has been in contact with myself on numerous occasions. The Meet-The-Speaker dinner will be at 6 PM at the Village Inn. Please make your reservation with Gary, WA2OMY. CU in the Sprints!

73, Paul Drexler, WB3JYO

Pack Rats **CHEESE BITS** is a publication of the Mt. AIRY VHF RADIO CLUB, INC. Philadelphia, PA. and is published monthly.

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Joe Kilgore, W2EIF  
(609) 783-9478

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DIRECTORS: N3EXA, Brian Taylor (1 YR)  
K3ESJ, Bill Jaxheimer (1 YR)  
WA3AXV, Ron Whitsel (2 YRS)  
WB2YEH, Bob Fisher (2 YRS)

**MONDAY NIGHT NETS**

<u>TIME</u>	<u>FREQ.</u>	<u>NET CONTROL</u>
7:30 PM	50.150 MHz	K3EOD
8:00 PM	144.150 MHz	W2EIF
8:30 PM	222.125 MHz	WB2YEH
8:30 PM	224.58R MHz	K3ACR
9:00 PM	432.110 MHz	WA3AXV
9:30 PM	1296.100 MHz	WA3NUF
10:00 PM	903.100 MHz	N3AOG

**COMMITTEE CHAIRMEN**

LADIES' NIGHT: WA3YUE 215-666-1558  
JUNE CONTEST: WB3DNI 215-672-5289  
HAMARAMA: WB3JYO 609-538-1687  
VHF CONFERENCE: KB3XG 215-270-3158

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## Calendar of Coming Events -May 1994

- 4 **ARRL Spring 432 MHz Sprint** (Wednesday evening) 7-11 local time. See March QST, page 120 for rules.
- 7 **ETA Aquarid meteor shower** predicted peak at 0913 UTC.
- 8 **Mothers Day.**
- 12 **Packrat Board of Directors meeting** at the QTH of Richard, N3AOG, at 8:00 PM. All interested Parties invited. Call 215-443-9965 for directions.
- 14 **Packrat Ladies Night** will be held at the Mill Race Inn, Holland in Warrington, Pa. starting at 6:30 PM.
- 14 **ARRL 902, 1296, and 2304 MHz Spring Sprint**, 6 AM to 1 PM local time. (Saturday Evening). These sprints will be held simultaneously. See March QST, page 120 for rules.
- 15 **Warminster Amateur Radio Association Hamfest** at the Middletown Grange Fairgrounds in Wrightstown, Pa. Talk-in on 146.69/.09 and 146.52. VE Testing.
- 19 **ARRL Night. Packrat general membership meeting** at the Southampton Free Library on Street Road in Southampton, Pa. at 8:00 PM. All club members and VHFers invited. A "meet the speaker" dinner will be held at Village Inn at 6 PM. Call Paul, WB3JYO, for reservations. Nominations for the election of officers in June will be accepted. Tim Duffy, K3LR, the new Atlantic Division CAC representative will be the speaker, with Hugh, W3ABC, and Kay, WT3P, also attending.
- 20-22 **Atlantic Division Convention and 60 th Annual Rochester Hamfest** at the Monroe County Fairgrounds near Rochester, NY. Talk-in on 146.28/.88.
- 21 **The 9th Annual Lancaster County Hamfest** will be held at the Ephrata Senior High School, Ephrata, PA. Talk-in on 144.85/145.45. VE Exam at 9 AM.
- 21 **The Cherryville Hamfest** will be held at the Warren County Fairgrounds in Phillipsburg, NJ. VE exams will be given.
- 21-23 **ARRL 50 MHz Spring Sprint** 2300Z May 22 (Saturday Evening) until 0300Z May 23. See March QST, page 120 for rules.
- 30 **Memorial Day.**

### MAY CLUB MEETING

The May club meeting will be our annual ARRL night (see the calendar of events above) and will also include nominations for office. Members are encouraged to nominate candidates for all open offices. The only constraint is that the nominee must agree to run for the office although he is not required to be present during the nominations.

### 10 GHz SSB SURPLUS MODULES

By Paul, WB3JYO

While at the DVRA hamfest, Bert, N2LIV, gave me a peak at some X-Band solid state modules that have recently become available to hams. Both a transmit and low noise amplifier are available. These units were designed by Qualcomm for a 12 and 14 GHz commercial trucking locating system. The XMIT module is 4 stages and produces 1.4 watts linear, the LNA has over 20 dB gain, noise figure is unknown. A matching power supply is available.

Prices:	XMIT Module	\$25.00
	RCV Module	\$12.00
	Power Supply	\$15.00
	Cases for XMIT/RCV	\$ 7..50

Other related components are also available. I will have samples available at the May meeting. Contact: Chuck Houghton, WB6IGP, 6345 Badger Lane, San Diego, CA 92119, call 619-460, 7277.

The Packrats wish to announce  
**Ladies Night 1994**



You are invited to a night of food, music and dancing to thank our wives or girl friends for letting us participate in club during the year. This years event is being held at The Mill Race Inn in Holland, Pa. starting at 6:30pm till 10:30pm. There will be music all night with dancing following a short awards presentation after dinner.

When : May 14, 1994

Where : Mill Race Inn  
 183 Buck Rd.  
 Holland, Pa.

Agenda : 6:30 - 7:00      Cocktail's  
 7:00 - 9:00      Dinner  
 9:00 - 9:30      Awards  
 9:30 - 10:30      Music and Dancing

Menu : Appetizer  
 Salad  
 Main Entree with Vegetables  
 Prime Rib \* \$2 EXTRA CHARGE \*  
 Chicken Cordon Blu  
 Stuffed Flounder  
 Desert  
 Coffee and Tea



Cost : \$20.00 per Person **CASH BAR!**

**R.S.V.P. BY MAY 4, 1994**



I / We Will attend Ladies Night 1994

Name(s) and Call \_\_\_\_\_

Address \_\_\_\_\_



Menu Choices : Prime Rib \* \$2 EXTRA CHARGE \* \_\_\_\_\_  
 Stuffed Flounder \_\_\_\_\_  
 Chicken Cordon Blu \_\_\_\_\_

Cost \$20.00 per Person  
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 Make checks Payable to:  
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**R.S.V.P. BY MAY 4, 1994**

Mail to : Bruce Loss WA3YUE  
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 Phone (610) 630-1875

## SKEDS WANTED

Packrat Multiop W3CCX will again be operating the ARRL June VHF contest, June the 4th and 5th in grid square FN21 atop Camelback Mountain in the Pennsylvania Pocono mountains. We are looking for schedules for all bands 50 MHz through 10 GHz. 144 MHz EME and meteor scatter contacts will be appreciated. For more information, contact Paul Drexler, WB3JYO at 908-935-7150 during the day and 609-882-7595 in the evenings.

## PERSIDES METEOR SHOWER DX-PEDITION

The Northern Lights Radio Society will be making a DX-pedition to grid EN15 (South Dakota) for a 4 day period during the August 94 Perseid meteor shower. The group's main intent is to work meteor contacts on 50, 144, 222, and 432 MHz with a goal of working a 50 states during the period. The group will also be looking for long-haul tropo skeds on all bands thru 3456 MHz. More information will follow in Cheesebits and QST.

## SWAP SHOP

(send all ads to the editor)

**FOR SALE:** K1FO 500 watt linear amps. 1 for 144 MHz and another for 432 MHz. Each desktop complete with power supplies, metering and manual. Recently put into top condition by Gary, WA2OMY. Each has a single 8874, \$650.00 each. 1 W3CXU HB 222 MHz linear with a 8874 in a cavity. Includes filament supply and metering in a 5 1/4 inch panel. Requires a 2000 volt, 500 ma. power supply, \$300.00. Contact John, W3CXU at 215-885-9839 between 7 to 9 PM.

**FOR SALE:** ITT 10 GHz TWT with power supply, 7 watts output, \$175.00, Contact K. A. Stovel, K2MPD, at 908-356-4628.

**FOR SALE:** 10 and 24 GHz M/A COM Gunplexer Transceivers (P/N's MA86501M and 86859), including 17 dB horns and on-board voltage regulators, \$125.00 each or both for \$200.00. Call Mike, NG2P at 1-800-345-3851 during the day or 607-553-7340 in the evening.

**FOR SALE:** YAESU FTV-901 Transverter for 2 meters, 70 cm and can add a third module for 6 M, very good condition, \$300.00. 6 Meter 850 watt output HB Amplifier, 3-500Z with power supply, \$500.00. Kantronics KAM unit, good condition, \$160.00. Hays Smartmodem, 9600 baud external, good condition, \$65.00. Blank Disks, 3 1/2 inch HD, \$0.50 each, 5 1/4 HD, \$0.40 each, minimum 25. Contact Mike, N3BBI.

## HEALTH and WELFARE

Mike, N3BBI, went into surgery on 22 April and expects to be back at work on 2 May.

## PHONE NUMBER CHANGE

Bill Murphy, W0RSJ, (610)-252-3956 (H) and 908-234-3888 (W)

## TID BITS

The ARRL released a Report and Order regarding messages being handled on packet radio. The new rules essentially remove the responsibility of all but the originating station to be responsible for the contents of the messages.

## CHANGE of ADDRESS

Chuck Steer, WA3IAC  
3446 Shelmair Ave.  
Philadelphia, PA. 19136

## VISITORS AT THE APRIL MEETING

no call, Sarah Keshall, Coatesville, Pa.  
W2EA, Walt Schmidt, Haddon Twp, NJ  
K2UYH, Al Katz, Robbinsville, NJ  
KB2AH, Tom Dinyovszky, Brielle, NJ  
N3DQZ, Jack Kauker, Doylestown, Pa.  
N3EMA, Joe Bagnick, Chalfont, Pa.  
KZ2S, John Golomb, Wall, NJ  
N3RTO, Larry Newberry, Chalfont, Pa.

## Hints and Bits - Driving that Solid State Amp.

By Dave, WA3JUF

Are you running your power amplifier above it's rated power output? Below is RF Data taken on a brand new solid state 2 meter linear amplifier. The unit is rated at 25 watts for 160 watts output, which it does. However the power gain compression is already 1.3 dB. A good rule of thumb is 1 dB compression max.

If is it run at the max Pin level of 40 watts, then the unit is 2.5 dB compressed. This is fine for CW and FM only ! For SSB, the amplifier should be used at about the 150 watt level- period ! If you have a 25 Watt radio, it probably puts out more than 25W, therefore you are overdriving the amplifier and producing splatter and distortion that is literally tearing up the 2 meter band.

The power level of the driving equipment must be limited to 20 watts or so. An attenuator can be built using RG-58 cable. Calculate the amount of attenuation required and use the ARRL Handbook to see how much cable you need. Since most of these new amplifiers have a GaAsFET preamp, the cable attenuator will have no effect on the received sensitivity at all.

You will not be able to see the difference between 140 Watts and 170 watts when you are working stations, but there might be a big difference in the cleanliness of your signal on the band.

Pin (W)	Pout (W)	IC (A)	Pg (dB)	Comp (dB)	
5	43	10.5	9.35	-	
10	85	15.0	9.30	0.05	
20	145	17.6	8.60	0.75	max drive point
25	160	18.5	8.06	1.29	useable
30	170	20.0	7.50	1.85	splatter
40	195 Saturated		6.88	2.47	UGH !

## Hints and Bits - Coaxial Antenna Relays

By Dave, WA3JUF

COAXIAL ANTENNA RELAYS: Several relays made by Toyotsusho Co., Ltd. of Japan are available from Down East Microwave or Henry Radio. The TsoTsu CX-600N is an N-connector unit configured like a Dow-Key relay and handles 600W from HF to 500 MHz. It has large non-shorting contacts, so the isolation is not great above 2 meters. Built like a good Amphenol relay, the CX-520D has N-connectors and shorting contacts on the unused port and is good from HF thru 1296 MHz. Power handling is 600W at HF and 300W at 1 GHz. Isolation is 75 dB at 2 meters and 50 dB at 1 GHz. The CX-230 is a BNC relay similar to the Dow-Key DK-77. These relays have 12VDC coils. The CX-520D is the better relay.

For 2.3 GHz and up: Transco relays are good up to 3.4 GHz. The DC-18 GHz SMA relays are good for all the microwave bands. The HP8761A relays are excellent even at 10 GHz (\$20 at Dayton). Don't forget to check out the TNC connectorized relays that show up at flea markets. Some of these are good at >6 GHz and are available because "nobody wants to use TNCs".

Specifications to consider when looking for coaxial relays are insertion loss, isolation and power handling capability. Insertion loss is the loss between the common and the switched ports. Isolation refers to the coupling between the open contacts, or the amount of power that will show up at the receive port when you transmit. Power handling is just that, although large power contacts usually mean lower isolation due to the RF coupling between ports.

The physical configuration is the main factor controlling the above specs. Open frame dc type relays work good at HF since the coupling between the large contacts and contact supports does not decrease the isolation or increase loss.

## Hints and Bits - Coaxial Antenna Relays -Contd.

At VHF and above however, the extra capacitance will cause loss and poor isolation. Dow-Key type relays built for power handling and are good up to 220 MHz or so due to poor isolation. Microwave relays are configured with small contacts in shielded compartments to reduce coupling, hence lowering the insertion loss and increasing the isolation. Insertion loss of < 0.2 dB and isolation of >45 dB would be good for a coaxial relay. When in doubt, have someone measure the relay on a network analyzer.

### GARY's TEST EQUIPMENT CORNER- DIRECTIONAL COUPLERS

By Gary, WA2OMY

Last month some ideas were presented to help find a microwave wattmeter. The first accessory you will need to use a sensitive wattmeter like an HP 431, will be some kind of RF directional coupler or sampler to lower the power presented to the power head. Some applications for couplers around the hamshack would include:

- Measuring the power output from transmitters.
- Connecting your transmitter or LO to a spectrum analyzer
- Reducing your multimode rig's 10 Watt output down to <1 mw. to drive your transverter.
- Measuring the return loss or SWR of your amplifier or antenna.

Several types of directional couplers have been presented in homebrew articles from conference notes, Cheesebits, ARRL publications etc. If you are looking for something commercial at flea markets, or like some of us, have more money than time, there are several alternatives to homebrewing. Most of the RF couplers available on the surplus market will be manufactured by HP, Narda, or Microlab/FXR. These manufactures each produced a line of directional couplers using a machined housing with N connectors. There are also many types of smaller couplers and power dividers with SMA connectors, SMB, BNC etc., all manufactured by a variety of microwave suppliers. These types of directional couplers may be excellent to install in a microwave rig to monitor LO or output power with a cable to the front panel, however for repeated bench testing, a large coupler with N connectors may be more convenient.

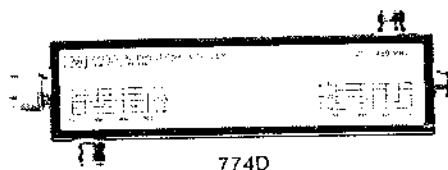
Most manufactures like Narda produce a product line using standard coupling values such as 3, 6, 10, 20, and 30 dB. However just about any value is available on special order. When shopping for directional couplers be sure to check the coupling value. Most are marked on the sidewall or are part of the part number. If the part number ends in a -6 or -10, it should be ok to assume it is 6 or 10 dB, etc. Another number you will have to keep in mind when looking for a coupler is the coupling value you will need for your purpose. Let's take for an example, measuring the power output from your 3456 TWT amplifier, specified at 20 Watts. 20 Watts is the equivalent to +43 dBm. Since the maximum power you can apply to your power head is +10 dBm or 10 mw., you will need to couple or attenuate the signal by 23 dB. Looking at our standard coupling values, a 30 dB would be required. We can use a 20 or a 10 dB if an attenuator or a pad is placed on the coupled port. If you are working on power amplifiers, a variety of attenuators should be at hand. Another advantage of measuring power using this method is the power capability of the pad is reduced, for example if your 20 watts is coupled by 10 dB you would have 2 watts at the coupled port. A pad rated at 2 watts should be easier to find and much less expensive than a high power attenuator. Shown are some diagrams and pictures of various directional couplers for shopping information.

A major difference between the large N type directional couplers and the small SMA type is the directivity. Although this will not be of concern for most ham applications an explanation is included on the next page. There are various formulas for calculating the maximum SWR which can be measured when the directivity is known. The basic idea for an amateur test is, with better directivity, the effect of the match at the output port on the measured value is reduced.

#### 774D, 775D, 776D, 777D, 778D, 11692D Specifications

Model	Frequency Range (GHz)	Nominal Coupling (dB)	Maximum Coupling Variation (dB)	Minimum Directivity (dB)	SWR Primary Line Maximum (50% Nom.)
774D	0.215-0.450	20	±1	40	1.15
775D	0.450-0.940	20	±1	40	1.15
775C	0.940-1.90	20	±1	40	1.15
777D	1.90-4.0	20	±0.4	30	1.2
778D	0.10-2.0	20	±1.5	0.1-1 GHz: 36 1-2 GHz: 32	1.1
11692D	2.0-18.0	22	±1 incident to test port	2-8 GHz: 30 8-18 GHz: 26	2-12.4 GHz: 1.3 12.4-18 GHz: 1.4

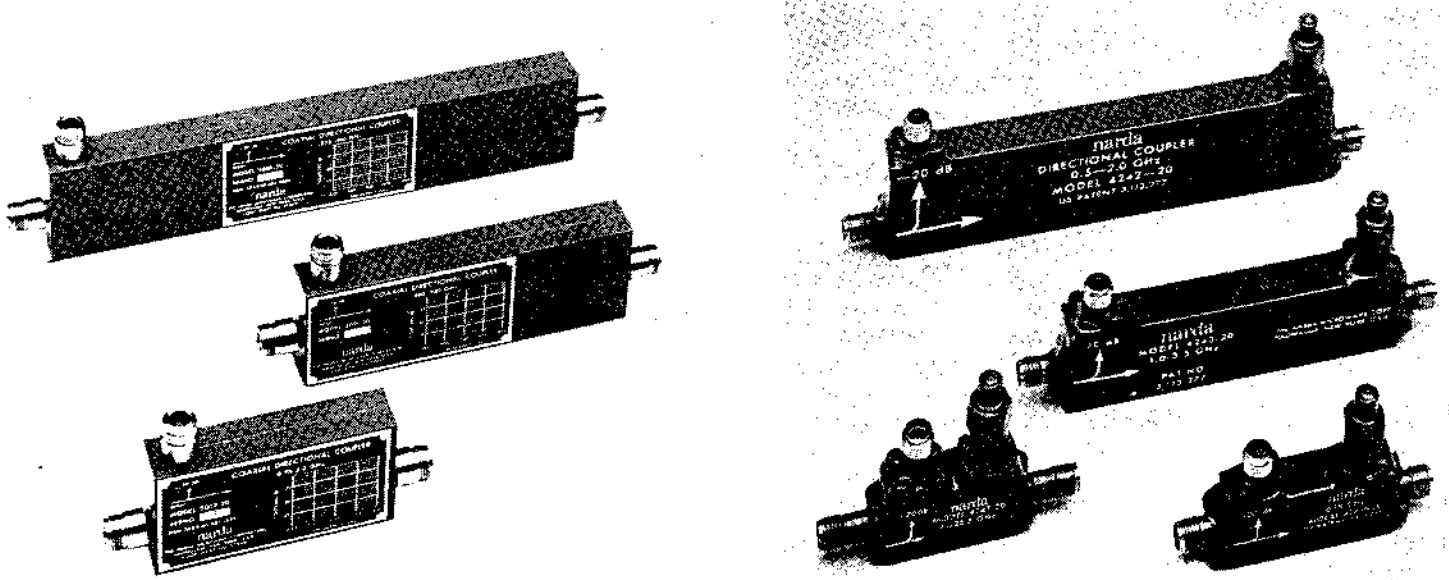
Typical HP Coupler Specs



774D

HP Dual Directional Coupler

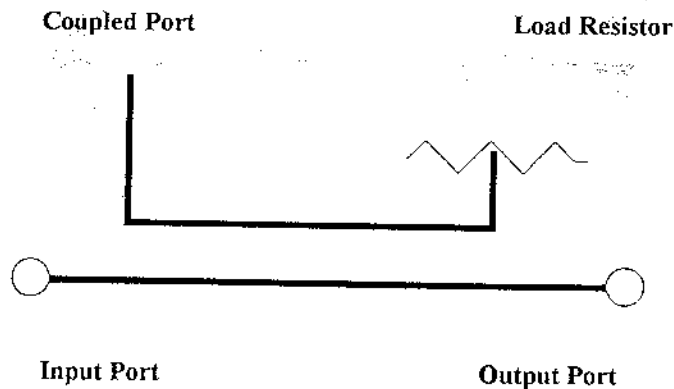
**GARY's TEST EQUIPMENT CORNERContd.**



**Narda Directional Couplers**

**Couplers with SMA connectors**

**Typical Coupler schematic and operation**



The coupler value in dB will be the power available at the coupled port referenced to the input power available with the output terminated in 50 ohms. The directivity of a coupler is the power available at the coupled port with power placed into the output port and the input terminated in 50 ohms. This power is referenced to the coupled power. For example, if the coupler is specified at 20 dB and the directivity is specified at 40 dB, then the power at the coupled port would be 60 dB down from the power at the output port. Note that the load resistor shown in the schematic is usually built into the port.

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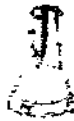
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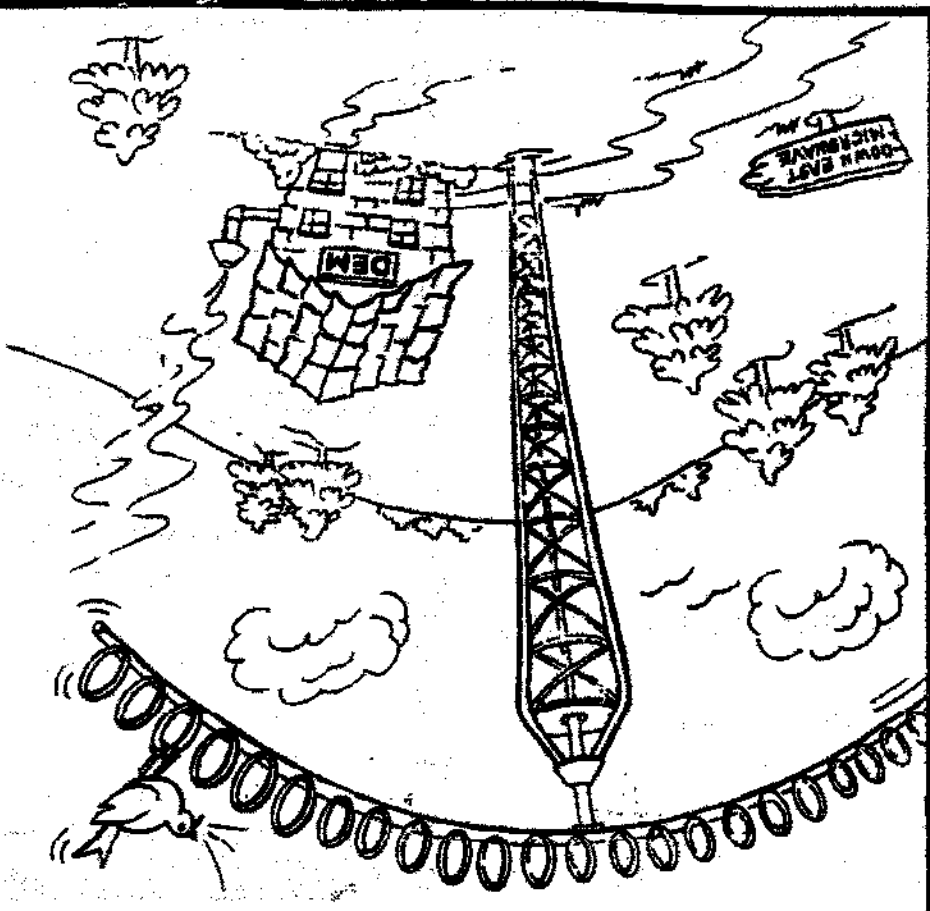
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