

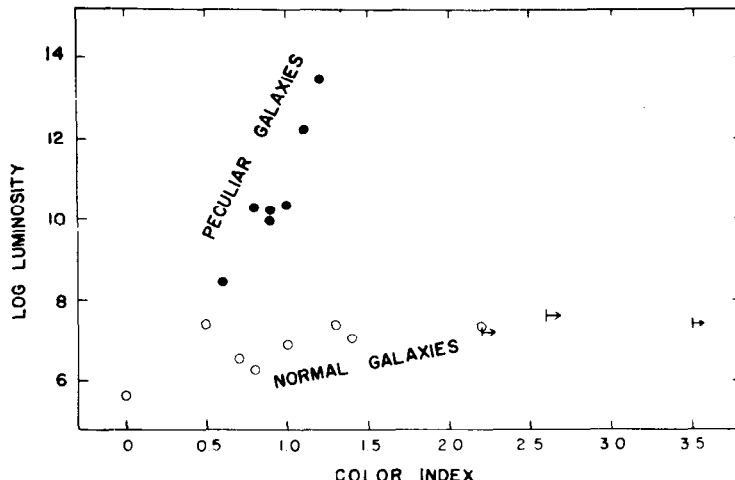
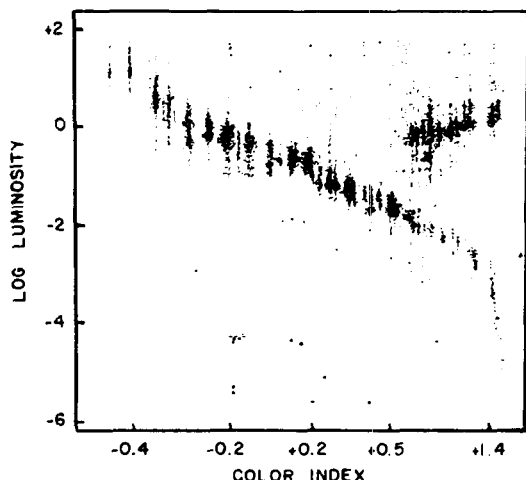
the Bulletin Board

VOLUME 14 - NUMBER 22

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RADIO COLORS



BANK HOLIDAY February 13

The People's National Bank facility on site will be closed on Monday, February 13, in observance of Lincoln's Birthday.

DON'T FORGET TO VOTE

Don't forget to cast your ballot in the BERA Executive Board Election. Ballots must be returned to Grace Siemen, Secretary, BERA, T-100, prior to February 10, 1961.

TICHMAN TRIO

The fourth concert in the BERA Concert Series will take place Tuesday evening, Feb. 21, at 8:30 in the Research Staff Lounge. The featured artists will be the Tichman Trio, consisting of Herbert Tichman, clarinet; Ruth Tichman, piano; and Ray Schweitzer, cello. This young and interesting group has concertized throughout the U.S. and has been well received wherever they have performed. The N.Y. Times wrote "the Tichman Trio is a welcome addition to the concert life of this city," while the Herald-Tribune thought they "played with steady musicianship and intelligence."

The program will consist of Beethoven's Trio in B-flat Op. 11, three pieces from Op. 83 by Max Bruch, the Trio by Robert Parris, and Brahms' Trio in A-minor Op. 114.

Single admissions will be \$2.50; children (including high school students) \$.75.

Left: Color-magnitude diagram for stars using visible light. Right: Color-magnitude diagram for galaxies using radio waves.

The following article was written for THE BULLETIN BOARD by a member of the staff of the National Radio Astronomy Observatory in Greenbank, West Virginia. The article reports on one phase of the research being done at NRAO, Brookhaven's sister institution under AUI.

The concept of color is one which we usually associate only with the visible region of the electromagnetic spectrum. A body, such as the filament of a light bulb, which emits light of all wavelengths has a color which is determined by the wavelength of the maximum emission. For example, a relatively cold body is said to be red hot. If it is heated still more the wavelength of maximum emission moves toward the blue end of the spectrum, and then it can become blue hot.

Color may be measured in a numerical way by describing the ratio of intensity at two chosen wavelengths. A red object emits a greater intensity at long wavelengths, while an object which is blue will have a greater intensity at short wavelengths. Stated in this way, the concept of color can be applied to emission at any point of the electromagnetic spectrum and is not necessarily limited to the visual region where the sensation of color can be detected by the human eye.

One of the early discoveries in the still new science of radio astronomy was that the visible stars are not detected with radio telescopes. On the other hand, there are a great number of "radio stars," more accurately called radio sources, which at first were not identified with any objects known to astronomy beforehand. Some of these radio sources have been identified with optical objects in recent years. One of the problems before radio astronomy is to gain a fuller understanding of the nature of the mechanism by which these sources emit radio radiation. In particular we would like to know why some sources emit more radio radiation than others which may have similar appearance in optical telescopes.

Much understanding of the nature of the stars was gained over past years by plotting a diagram which related the intrinsic brightness of the stars to their

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RADIO COLORS — continued

colors. Such a plot, called a colormagnitude diagram, shows that not every combination of color and intrinsic brightness is possible. The stars fall in sequences or groupings on the diagram. This fact shows that the stars must all be built on similar lines, with a limited number of variables to distinguish one star from another. We have learned that the principal variables are the mass of the star and its age. These two factors control the appearance of the star, in particular its brightness and its color. Studies of color-magnitude diagrams for different astronomical systems have taught us much about the evolution of stars.

An effort has been made at the National Radio Astronomy Observatory at Green Bank, West Virginia, to construct a similar diagram for some of the extragalactic radio sources, those which are outside our own Milky Way Galaxy. The work was done by Dr. David S. Heesch, who is head of the NRAO Astronomy Department. Using the 85-foot Howard Tatel Telescope, Dr. Heesch compared a number of the extragalactic radio sources with a "standard" radio source, Cassiopeia A. The comparisons were made at two frequencies, 440 megacycles and 1400 megacycles. The brightness of each source is given by the ratio of its emission to that of Cassiopeia A at the appropriate frequency. The difference between the ratios at the two frequencies for any one source is a measure of the color in the radio region.

The distances of the extragalactic sources used in this investigation were determined from optical astronomy. Knowing the distances of the sources it is possible to compute their relative intrinsic luminosities. When the luminosities are plotted against the colors, as shown in the diagram, we find that the extragalactic sources fall in two sequences, very reminiscent of the case for stars in the optical region.

The two sequences can be identified with peculiar galaxies and with normal galaxies. The normal galaxies are systems of stars such as the Milky Way Galaxy within which we live. The peculiar galaxies are usually highly excited objects. Some of them have been supposed to be pairs of galaxies in collision. The peculiar galaxies have colors which increase with their intrinsic brightness. The brighter the peculiar galaxy, the redder it appears.

This work is of a preliminary nature. It is interesting however to speculate on why these galaxies should fall in sequences such as the stars do in the optical region. Dr. Heesch points out two surprises in connection with this diagram. The peculiar galaxies involved appear to have relatively little in common as a group. "It is somewhat surprising that such a diverse group of objects should form a well defined color-absolute magnitude sequence. If real, it suggests that the sources must all have the same mechanism for radio emission, and that some parameter common to them all controls both the color and the absolute magnitude at radio wavelengths." The normal galaxies are all relatively similar objects and it is not surprising that they should all have about the same intrinsic brightness. However, it is surprising that there should be such a range of radio color for these objects.

It is not yet known how other normal galaxies which have different optical characteristics from the ones studied here would appear on this diagram. One of the reasons for the desire for a much larger radio telescope is to extend this work to many more galaxies than can be detected with the 85-foot telescope.

DISCOUNT TICKETS

Discount tickets to the following shows and games are available at the Personnel Office, 58 Brookhaven Avenue:

THE MUSIC MAN,
Broadway Theatre, NYC

EPITAPH FOR GEORGE DILLON,
Actors' Playhouse (Sheridan Square),
NYC

MARINE RECREATION SHOW,
Island Garden, W. Hempstead
WORLD SERIES OF PROFESSIONAL TENNIS,
Madison Square Garden (Feb. 8)

FOURTH BROOKHAVEN LECTURE

By: Dr. Gerhart Friedlander

Title: Nuclear Chemistry Research with
the Cosmotron

Lecture Hall: 8:00 p.m., Wednesday,
February 15

A buffet supper (\$2.75) will be served at the Brookhaven Center before the lecture, beginning at 6:00 p.m. Reservations should be made at least one day in advance, by calling Ext. 2302 before 5 p.m., or Ext. 2453 in the evenings.

Refreshments will be available in the Research Staff Lounge following the lecture.

THE ICE AGE COMETH?

Last Friday and Saturday's 17 inch snowfall brought the total during the 1960-61 season so far to 55 inches. BNL Meteorology records indicate that we may be well on the way to setting a new snowfall record; previous seasonal highs were 66.7 inches during 1947-48 and 61.1 inches in 1957-58.

January, 1961, was the coldest month on record in BNL Meteorology annals. The mean daily temperature of 23.2°F was 7 degrees below the normal mean for January, and the lowest monthly mean temperature ever recorded at the Laboratory. On 13 consecutive days the temperature never rose above freezing, and on 3 consecutive nights the temperature fell below zero, establishing a new record low of -22.8°F. Throughout the month there were 4 nights when the temperature was below zero. This has occurred only once before, in December of 1958. On all but one night of the month the minimum temperature was below freezing. January degree days totalled 1297, the highest ever recorded in one month.

Snow fell on 9 days, with some snow on the ground 16 consecutive days. Snowfall totalled 24 inches, the greatest monthly snowfall since the 26 inches recorded in January of 1948.

Prolonged freezing temperatures and heavy snowfalls have combined to make the weather unusually severe. Records at BNL show that usually in mid-winter, relatively light snowfalls occur with very cold temperatures and heavy snowfalls are accompanied by relatively mild temperatures, but January was unique. Last weekend's storm fell within the more usual pattern.

BOWLING TOURNAMENT — March 4th

The BNL Bowling Executive Board will sponsor a Mixed Doubles, 3 game, Handicap Bowling Tournament at one of the lanes on the South Shore on March 4th. You needn't belong to a league or have an established average to enter. The only stipulation is that at least one member of the team be a BNL employee. Watch next week's BULLETIN BOARD for all the details.



BERA BOWLING

RED LEAGUE

It looks like this really cold weather doesn't worry the Bismuth Kings. They took 3 points from the Skins, leaving them only one point. The B.K.'s who gave the Skins a close shave were Varela-478, Carsten-491, Watson-499 and Zinna with a 526. The Skins who had trouble keeping their hair out of their eyes were Borzi-504, Bugala a 536 and Weinman with a 537.

Well, the Downunders were well matched against the Biology team; they split 2-2. When the pressure is on, the Downunders' Captain (Fales) fights harder and came up with a 456 series. According to the scores, nobody from Biology fought as hard as Fales. McGovern found out too late that the Coca-Cola tap was frozen.

BLUE LEAGUE

The Techs, although still leading the League by 6 points, slipped into the losing column when the Splitters took three from them. The Champs rolled their usual big games with Hildenbrand 220-512 series, Larson 203-528 series, Gangamella 189-508 series and Wesel a 188 game. For the Splitters Sick 180-520 series, Carter 181-507 and Gallagher a 188 game.

The Pacers are now in third place, behind the Splitters, after taking three from the Nuclides. Jackson came home strong in the third with a 230 game. He really didn't have to though, a 62 would have given the Pacers the same 3 points. Milau and Kukacka saved it from being a rout by their 185 and 183-519 series, respectfully.

The Snafus now in fifth behind the Nuclides won three from the Meteors. Uddman's 179 was best for the winners. The Meteors failed to orbit.

The Powermites and Bubble Boys split 2 and 2. Top score of the night in the league was the Bubblers' Scheliga with a 242-534 series. Teammate, Ferrante, bowled a 187. The Powermites took the first two games in a team effort with Shelton knocking 71 pins over his average.

Blue Ball goes to Joe Scheliga in a tight race for high gross score (incl. Handicap) with a 567.

LADY KEGLERS COLUMN

Twinkle Toes, taking four points from the Odds and Ends, moved into 1st place, with a one point lead on the Medigals. Alley Kats, as a result of losing three points to the Medigals, dropped into 3rd spot. All Thumbs took 3 points from the Boo Boo's, moving them up to 4th. Nightingales took three points from the APC's with all sorts of split conversions - Regina Svendsen 4-7-10 (TWICE IN A ROW), and Kathy Bason 5-7 for the Nightingales. High games for the night were: Grace Siemen 193-516, Elaine Daniels 171, and Jean Hughes 161.



If you have to, dig your way to the Gymnasium this Friday or you'll miss the biggest social function at BNL this season. BERA'S Dance Committee has prepared an evening of enjoyment for all those who attend the Valentine Dance on February 10th at 8:30 p.m.

The Starlighters, a twelve man band, will provide the musical entertainment from 9:00 p.m. to 1:30 a.m.

Beer, club soda, ginger ale, Seven-up, hot dogs, and coffee will be sold at our refreshment counters at a nominal cost. Ice will be on hand for those who bring their own bottles. Door prize, give-aways, balloons, and a guaranteed good time are yours for \$1.50 each, employee and escort; \$2.50 for guests.

Admission will be collected at the door. Exit passes will be issued at the Gym for all guests.

UPTON ARCHERY CLUB MEETING February 14

There will be a meeting of the Upton Archery Club on February 14, at 5:30 p.m. in the Recreation Building.

Indoor range and shooting regulations will be the order of business. Membership is open to all those who are interested in joining the club. Membership fee is \$3.00. Only those who are registered members will be permitted to shoot.

An indoor shooting range has been established in the Gym. The club will start shooting indoors on February 20, at 7:30 p.m. For more information, call Al Delph, Ext. 439, or Frank Humphry, Ext. 451.

GYM CLOSED THIS WEEK

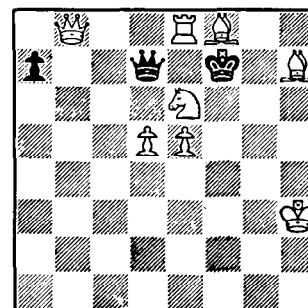
The decorating preparations for the BERA dance this Friday have made it necessary to discontinue all physical activities in the Gym until Tuesday, February 14th.

BNL SAFETY RECORD

There have been no disabling injuries at BNL thus far in 1961.

CHESS PROBLEM

White mates in two



In this week's problem it is white's move and there should be a mate in two moves. Answer elsewhere in this week's BULLETIN BOARD.

ANSWER TO CHESS PROBLEM

There are four possibilities:

- | WHITE | BLACK |
|----------------------------------|-------|
| A. 1. Q - N 5 (threat 2 Q - B 1) | Q x Q |
| 2. R - K 7 mate | |
| B. 1. Q - N 5 | Q x N |
| 2. P x Q mate | |
| C. 1. Q - N 5 | Q x P |
| 2. N - N 5 mate | |
| D. 1. Q x N 5 | K x R |
| 2. B - N 6 mate | |

YOUR GUESTS AND VISITORS MUST BE REGISTERED

Staff members are responsible for the registration of their guests and visitors, if not already registered and in possession of exit passes or Laboratory I.D. Cards. Guests and visitors include all persons brought or arriving on site for professional or business reasons, tour, social or recreational purposes, or to visit the Apartment Area, the Medical Research Center or the Brookhaven Center. Places where guests may be registered are listed below.

Registration During Regular Working Hours

Administration Building
Biology Department
Personnel Office
Atomic Energy Commission Office
AGS Service Building
Reactor Building
Purchasing Office
Nuclear Engineering Laboratory
Security and Police Building
Medical Center (Out Patients Only)
Cosmotron

Registration After Hours, Weekends & Holidays:

The Brookhaven Center - After 1700 when open. (Alien passes not issued here). Police Headquarters.

Registration After Hours

Social Functions

Swimming Pool - During open hours. (Alien passes not issued here.)

The Brookhaven Center - After 1700 when open. (Alien passes not issued here.)

Recreation Building, Theatre, Lecture Hall and places where dances, lectures, plays, motion pictures and recreational activities are open to visitors, register at the location of the function or at Police Headquarters.

NEW DANCE CLASS

Beginners! Intermediates! Advanced! Come to the Recreation Building on Tuesday, February 14th at 8:30 p.m. This will be your opportunity to voice your desires towards the organization of the new Arthur Murray Dance Class.

CLASSIFIED ADS**FOR SALE**

1959 RENAULT DAUPHINE - 4 dr., r&h. Sun roof, extended shift handle. 18,000 miles, like new. \$595. L. Chiro, Ext. 451.

1955 CHEVROLET-210 - 4 door sedan, two tones, heater and new radio, snow tires, new brakes, new clutch, new seat covers, quick-starting, uses no oil, owner leaving the country; asking \$450. Call Ext. 634 or 749.

1954 OLDS - Black Super 88, 4 dr. Body and interior very clean, new automatic transmission, new carburetor, r&h, side mirror, white-walls and extra spare tire (snow); This has been a one family car; (Note: Car very dependable, it has started every cold morning this winter, with ease.) \$300. Call Bill Walsh, Ext. 322.

HOUSE - Yaphank, 10 minutes from Lab. Landscaped lot 125'X200', two bedrooms, modern kitchen, full cellar with finished room. Five years old. \$10,800. SH 4-5096.

RANCH HOUSE - Oakdale, 6 rooms, 3 bedrooms, ¼ acre corner, garage attached, full basement, storm doors, screens, venetian blinds, other extras. \$13,990. Take over existing \$11,500 FHA 27 year 5¼% mortgage. SA 4-4497.

RANCH HOUSE - East Patchogue, 3 bedrooms, brick, and matching spacious 2-car garage. 6 years old; patio; plot 75X160; basement, ceramic tile bath, hot water heat, carpeting, many extras. AT 6-8712.

SPLIT LEVEL HOUSE - On beautiful wooded ½ acre lot. 3 bedrooms, 1½ baths, large living room, 26 ft. playroom, laundry room, fireplace, private beach rights dishwasher, storms and screens. \$18,500. Ext. 465 or Sh 4-9877, evenings.

PRAM - 8 ft. \$40. 1½ h.p. Evinrude \$20. Package Deal \$55. Call John T. Ext. 2376.

DRYSINK-HUTCH - Early American knotty pine drysink - hutch combination. Suitable for Hi-fi enclosure, storage etc. Excellent condition, reasonable, Kaiser, Ext. 375.

HEATH KIT AUDIO GENERATOR - A-6-8 New. BE 7-0129.

TELESCOPE - Refracting 40-115 power, excellent. J. Faust, Ext. 2255.

RECORD PLAYER - V.M. 4 speed, table model with 3 speakers, new cond. Call evenings after 6 p.m. GR 5-5018.

1952 CHEVROLET - Clean, 2 door Sedan, r&h, good running cond. & tires. \$150. Ext. 339. Joe Trebing.

LADIES SWEATER - Bulky knit, red & white design. Size 38-40. Hand knitted. Cost of wool \$10. Will sell for same. Ext. 2367.

ENLARGER - 35mm Federal, like new cond. Counterbalance, extras. \$20. Walt, Ext. 356.

STAMP COLLECTION - U.S. & Foreign. Best offer takes it. Ed Reilly, Ext. 434.

GIRL'S FIGURE SKATES - Excellent cond. Size 3, Harbottle, Ext. 625.

SAILBOAT - Old Town lapstrake, 14 foot, mounting for outboard. Sound but needs work. New canvas deck. Asking \$150. Call Mac, Ext. 776 or 2315.

807 AMP - Williamson Type with separate power supply and preamp -30 Watt. \$25. Hank, Ext. 601.

WANTED

HIGH CHAIR - and stroller in good condition. Call BE 7-0595J.

GIRL'S FIGURE SKATES - Must be in good condition. Size 4, Harbottle, Ext. 625.

WHITE GAS RANGE - Must be in good condition. Call PO 8-2814J after 6 p.m.

HOME - for puppies. Sven Wichman, Ext. 2158.

USED TV SET - 17 in. or larger. Ext. 2460, evenings Ext. 703.

NOTICE - 25 year old foreign girl would like to stay with a family and children for one year in the U.S.A. to brush up her language. Who would be interested? For further information contact after 6 p.m. AT 6-8306.

CAR POOLS

Driver wanted for car pool from Sayville-West Sayville area. Call J. Daane, Ext. 779.

Ride to Adelphi - Garden City, Thursday and/or Friday evenings for 7-9 p.m. classes. W. Bornstein, Ext. 2228 or PO 8-0927R.

Want to form or join car pool Port Jefferson, Smithtown, Stony Brook area to Hofstra Coll. Tues. and Thurs. eves. for 8-10:45 p.m. class. J. Walsh, Ext. 454 or ST 7-6170

Would like to join car pool from vicinity S. Country Shores, E. Patchogue. M. Darden, or AT 6-8205 after 5:30.

Want to join car pool from vicinity of Blue Point Ave. & Middle Road. Joe Shaber, Ext. 553 or 2106.

Want ride from Wading River to Lab. D. Meehan, Ext. 2398.

FOR RENT

FURNISHED APT. - 3 rooms, all utilities and garage. Middle Island, \$90. Call YA 4-6426.

HOUSE - 2 bedroom bungalow. Close to all facilities, \$75 mo. AT 6-9316.

APARTMENT - 3 rooms, furnished, own entrance, \$90. BE 7-1036.

FURNISHED APARTMENT - 3½ rms., in Patchogue, available from early March - early July. Ext. 616, or AT 9-0714.

FOUND

GLOVE - One navy blue wool glove. Call Ext. 2107.

PARKER FOUNTAIN PEN - Name faintly printed: Y. Osawa. Call Fred Thompson, Ext. 583.

FOUND - Men's leather gloves. Call Personnel Services, Ext. 2107.

FOUND - Woman's white hat-scarf. Call Personnel Services, Ext. 2107.

Did anyone exchange rubbers with me at Brookhaven Center last Thursday (They are slightly too big for me but perhaps the other man might have trouble??) Call E. Courant, Ext. 374.