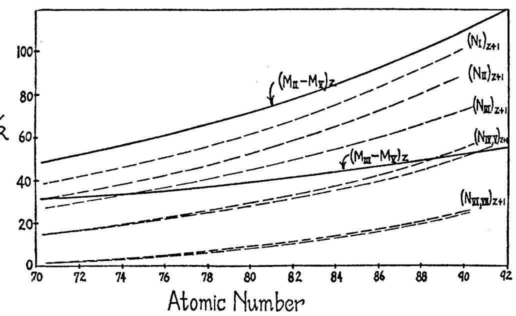

FIG. 2. The radiationless transition $M_{III}\rightarrow M_V$ on a ν/R scale plotted against atomic number, Z, and the ionization energy of the N-shells for $Z+1$.

ejected electron strongly overlaps the particular wave function for the $N_{IV,\ V}$ electron.

Now turning to Fig. 1, we see that the intensity of the satellite group on the left (short wave-length side) of each $M\alpha$ line increases from $z=78$(Pt) up to roughly $z=82$(Pb); beyond, at Th(90) and U(92), the satellite group intensity has decreased very markedly. Thus there exists an unmistakable intensity maximum due to the Auger effect, and we may say definitely that for the $M\alpha_1$ satellites the initial state is $M_VN_{IV,\ V}$; the final state $N_{VII}N_{IV,\ V}$.

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Cosmic-Ray Intensities and Air Masses

Blackett[1] has shown that the "temperature effect" of cosmic rays is due to the vertical shift of the layer in which mesotrons are formed and has further suggested that it may be possible to correlate cosmic-ray data with the structure of depressions. Loughridge and Gast[2] have pointed out that cosmic-ray intensities in America show a noticeable change at the fronts separating different air masses.

Our polar continental (*Pc*) air mass[3] originates in Manchuria and Siberia and comes to Japan proper as the Northwest monsoon in the colder half of the year. The tropical maritime (*Tm*) air mass flowing from the North Pacific subtropical high pressure belt comes to Japan proper as southerly tropical air mainly in the warmer half of the year. The polar maritime (*Pm*) air mass originates in Okhotsk sea and the sea to the east of Japan and comes to Japan proper as the mild Northeast wind in the rainy season. The *Pm* air mass found in Japan is shallow, but plays an important weather rôle. The mass is seldom thicker than 2000 m and is usually overrun by *Tm* air mass; the interaction of these two air masses results in the formation of a stationary front and is responsible for the gloomy and rainy weather of the Bai-u period of Japan. There are two other modified polar continental air masses, which lose their original coldness and dryness in the lower layers. One comes to Japan proper by the sea route from Northwest, and the air mass type transforms from the fresh one (*Pc*) to the modified one (NPc_1). The other arrives in north and central China by the land route and then comes to us by the sea route with the general westerly wind (NPc_2).

Cosmic-ray intensities under various typical air mass conditions prevailing in Tokyo during the year 1937 were picked up from the results obtained with a Steinke cosmic-ray meter inside 10 cm Pb and were given together with their barometer effects in Table I. The air masses were identified from the synoptic charts analyzed by the Forecasting Division of the Central Meteorological Observatory, Tokyo.

We see from the table that (1) both the correlation coefficient and the barometric coefficient are relatively high in the fresh *Pc* air mass and *Tm* air mass, and show a gradual decrease as the air mass type transforms from the fresh one to the modified one. (2) The correlation coefficient and the barometric coefficient are very low in *Pm* air mass, which is shallow and is overrun by *Tm* air mass. (3) The reduced cosmic-ray intensity is relatively low in warm air (*Tm* and *Pm*), but is high in cold air (*Pc*).

The explanation of these results on the basis of the instability of the mesotron will shortly be given in this column.

This work was done as a part of the program of the cosmic-ray sub-committee of the Japan Society for the Promotion of Scientific Research.

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TABLE I. *Correlation of air mass conditions and cosmic-ray intensities.*

AIR-MASS TYPE	*Pc*	NPc_1	NPc_2	*Pm*	*Tm*
Number of observations (6 hour mean)	49	75	24	30	67
Mean observed cosmic-ray intensity (*J*)	1.6266	1.5933	1.5881	1.5658	1.5647
Correlation coeff. between the atmos. pressure and the cosmic-ray intensity	−0.75	−0.44	−0.50	−0.04	−0.64
Barometric coefficient (percent per cm Hg)	−1.46	−0.92	−1.08	−0.15	−1.22
Reduced intensity to normal atmos. pressure 755 mm Hg (*J*)	1.6269 (+2.0%)	1.5944 (0.0%)	1.5943 (0.0%)	1.5670 (−1.7%)	1.5672 (−1.7%)
	(Annual Mean Value of $I_{755}=1.5943J$)				